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INTEGRATIVE REVIEW ARTICLE

NON-INVASIVE VENTILATION IN ELDERLY AFTER A STROKE

VENTILAÇÃO NÃO INVASIVA EM IDOSOS APÓS O ACIDENTE VASCULAR CEREBRAL

VENTILACIÓN NO INVASIVA EN LOS ANCIANOS POST ACCIDENTE CEREBROVASCULAR

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ABSTRACT

Objective: to get to know the publications about the use of non-invasive mechanical ventilation in the elderly after stroke. ***Method:*** integrative review in the databases LILACS, MEDLINE, CAPES Portal and SCIELO library. Selected articles were published in full text; in Portuguese or English; available in full on the internet and published in the 2007-2016 period, with the descriptors "elderly" and "stroke" and one of the descriptors "non-invasive mechanical ventilation", "artificial respiration" or "positive pressure breathing", being ten selected articles. The analytical reading was performed using a structured script. The collected data were organized in table and submitted to the analysis. ***Results:*** selected articles addressed stroke and obstructive sleep apnea. In eight articles, the ventilatory modality was continuous positive pressure and there were more publications in the year 2009. ***Conclusion:*** noninvasive ventilation presents benefits in the optimization, maintenance and reestablishment of the pulmonary function of the elderly after stroke. The low number of publications and the absence of protocols reinforce the need to build an instrument for this theme. ***Descriptors:*** Elders; Cerebrovascular Accident; Artificial Respiration; Positive Pressure Breathing; Non-Invasive Ventilation.

RESUMO

Objetivo*:** conhecer as publicações sobre o uso de ventilação mecânica não invasiva em idosos após o acidente vascular cerebral. ***Método*:** revisão integrativa nas bases de dados LILACS, MEDLINE, Portal CAPES e biblioteca SCIELO. Selecionaram-se artigos publicados em texto completo; nos idiomas português ou inglês; disponíveis na íntegra na internet e publicados no período de 2007-2016 obrigatoriamente constando os descritores “idoso” e “acidente vascular cerebral” e um dos descritores “ventilação mecânica não invasiva”, “respiração artificial” ou “respiração com pressão positiva”, sendo dez artigos selecionados. Foi realizada a leitura analítica utilizando roteiro estruturado. Os dados coletados foram organizados em tabela e submetidos à análise. ***Resultados*:** os artigos selecionados abordaram o acidente vascular cerebral e a apneia obstrutiva do sono. Em oito artigos, a modalidade ventilatória foi a pressão positiva contínua e houve maior quantitativo de publicações no ano de 2009. ***Conclusão: a ventilação não invasiva apresenta benefícios na otimização, manutenção e restabelecimento da função pulmonar do idoso após o acidente vascular cerebral. O número baixo de publicações e a ausência de protocolos reforçam a necessidade de construção de instrumento para esta temática. ***Descritores*:** Idosos; Acidente Vascular Cerebral; Respiração Artificial; Respiração Com Pressão Positiva; Ventilação Não Invasiva.

RESUMEN

Objetivo: conocer las publicaciones sobre el uso de ventilación mecánica no invasiva en ancianos post accidentes cerebrovasculares. ***Método:*** revisión integrativa en las bases de datos LILACS, MEDLINE, Portal CAPES y biblioteca SCIELO. Se seleccionaron artículos publicados en texto completo, en los idiomas portugués y / o inglés; disponibles en su totalidad en Internet y publicados en el período 2007-2016, obligatoriamente constando los descriptores "anciano" y "accidente cerebrovascular", y uno de los descriptores "ventilación mecánica no invasiva", "respiración artificial" o "respiración con presión positiva". Siendo diez artículos seleccionados. Se realizó la lectura analítica, utilizando guión estructurado. Los datos recolectados fueron organizados en tabla y sometidos al análisis. ***Resultados:*** los artículos seleccionados abordaron el accidente cerebrovascular y la apnea obstructiva del sueño. En ocho artículos, la modalidad ventilatoria fue la presión positiva continua y hubo mayor cuantitativo de publicaciones en el año 2009. ***Conclusión:*** la ventilación no invasiva presenta beneficios en la optimización, mantenimiento y restablecimiento de la función pulmonar del anciano después del accidente cerebrovascular. El número bajo de publicaciones y la ausencia de protocolos, refuerzan la necesidad de construir un instrumento para esta temática. ***Descriptores:*** Personas De Edad; Accidente Cerebrovascular; Respiración Artificial; Presión Positiva De Respiración; Ventilación no Invasiva.

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INTRODUCTION

Developing countries, such as Brazil, have shown an increasing population aging, which tends to cause an increase in the incidence of diseases in this age group, such as cerebrovascular diseases, especially Cerebral Vascular Stroke (CVS). [1] Studies report that, after the age of 55, the number of people suffering from strokes doubles with each decade of life, with men being the most affected. In recent years, stroke has been considered a major public health problem. In Brazil, the disease affects between 156 and 168 in every 100 thousand people and corresponds to the first cause of death.[2]

In the multi-professional team, respiratory physiotherapy plays a fundamental role in the rehabilitation process of post-stroke patients, since changes in thoracic biomechanics, relative immobility and cough reflex decrease are frequent and important clinical data and suggest a direct relation with pulmonary infections.[3-6] Dependent on severity, the patient may present respiratory discomfort, dyspnea, increased respiratory work, decreased peripheral oxygen saturation, respiratory acidosis, hypoxemia, among other clinical findings.

In an observational study of five Stroke Centers, patients with acute stroke remained more than 50% of the day restricted to the bed. Bedridden individuals present a decrease in pulmonary volumes and capacities and this reduction can reach between 25 and 50% of the expected indices. Respiratory changes are frequently described in post-stroke patients characterized by impairment of pulmonary mechanics and decreased respiratory muscle strength which, in addition to impairing lung function, can lead to respiratory complications and recurrent hospitalizations.[7]

In this context, mechanical ventilatory support is a type of technology used by physiotherapists to temporarily replace pulmonary function, totally or partially, in order to promote adequate alveolar ventilation, thereby correcting gas exchange and providing rest to the muscles respiratory ventilation.[8] Non-invasive ventilation (NIV) is a technological resource used by the professional physiotherapist who provides non-invasive mechanical ventilation in a non-invasive manner, without the need for endotracheal intubation. This support can be offered by negative pressure, currently in disuse, or by positive pressure.[9]

The noninvasive ventilation (NIV) technique is established in the airway through interfaces applied in the mouth and / or nose. The ventilator-patient interface is then performed through nasal, oral-nasal (face), buccal, nasal cushion, Helmet® helmets, oral masks, and total face mask.[10] Ventilator modalities in NIV are characterized by the application of continuous positive airway pressure during inspiration and expiration (continuous positive airway pressure - CPAP) or by the application of two levels of positive airway pressure - BiPAP, a greater inspiratory pressure (positive inspiratory pressure in the airways - IPAP) and another lower one at expiration (positive expiratory airway pressure - EPAP).

The clinical benefits of NIV are described in the literature and among the main ones are: reduce respiration work and respiratory rate; increase tidal volume; improve gas exchange and dyspnea; to promote resting of the respiratory muscles and comfort of the patient.[11] In Brazil, it has been increasingly administered by physiotherapists both in the infirmary, as well as in the Intensive Care Units (ICUs) and home care.[9,12] This technology is widely used either as an integral part of pulmonary expansion therapy and therapy for the removal of tracheobronchial secretions or as a method to provide relative respiratory muscle rest.[13]

In view of the above, it can be seen that the use of non-invasive ventilation may be a technological resource that provides benefits to the elderly care after stroke.

OBJECTIVE

- To know the publications about the use of non-invasive mechanical ventilation in the elderly post stroke.

METHOD

Integrative review built from the analysis of articles available online in the databases LILACS, MEDLINE, CAPES Portal and SCIELO library.

The six phases of the integrative review process are outlined below.[14]

The first phase is the elaboration of the guiding question. The same is a question that directs the study within the theme: What is the profile of the research done regarding the use of non-invasive ventilation in the elderly after the stroke in the last ten years?

The second phase comprises the search for articles in databases and was carried out in June 2017. The following keywords were used in the advanced search: descriptors: elderly and stroke and artificial respiration; elderly and stroke and breathing with positive and elderly pressure and stroke and noninvasive ventilation. And as filters: full text and

written in Portuguese or English; available in full on the internet and published in the last ten years (2007-2016). The research resulted in 127 articles, being zero article in the SciELO database, 24 articles in the CAPES Portal, one article in the LILACS database and 102 articles in the MEDLINE database.

As inclusion criteria, articles presenting the following descriptors previously defined in the context of the article "elderly" and "stroke" associated with "noninvasive ventilation" or "artificial respiration" or "positive pressure breathing" were selected as inclusion criteria. As exclusion criteria, there were defined: repeated publications or manuscripts as letters to the editor, theses, dissertations, monographs, books, book chapters, manuals and abstracts; studies that were not performed with the elderly; other neurological or neuromuscular diseases. The articles were screened consisting of, compulsorily, the descriptors elderly and stroke and one of the descriptors non-invasive mechanical ventilation, artificial respiration or breathing with positive pressure. After the selection, a total of ten articles were obtained for the study.

Then, in the third phase, the analytical reading of the abstracts, methods and conclusions of the articles was carried out using a structured script for the collection of data containing the following variables: content of the articles; year of publication; newspapers; collection instrument and data analysis technique.

The fourth phase was characterized by organizing the information collected in an instrument in Excel® spreadsheet format. Then, in the fifth phase, the discussion of the results was performed based on the interpretation and synthesis of the same, comparing the data found in each article selected with the literature on the subject and identifying the knowledge gaps to enable future studies.

The sixth stage consisted in presenting the results from a figure containing the information about the articles. The data were exposed and structured from the variables established in the collection instrument making it possible to better understand and compare the selected articles identifying patterns, differences and allowing the distribution in subtopics as part of the discussion.[14]

RESULTS and DISCUSSION

It is known that non-invasive ventilation is used by health professionals, especially physiotherapists, in various clinical situations, hospital, outpatient and home settings. However, this study describes the characteristics of the scientific researches that approach the subject with the elderly person after the stroke. The results of the study are presented in figure 1.

Title of the article	Journals and Qualis	Author and year of publication	Collection instrument	Data analysis technique
1.Success and failure of mirtazapine as an alternative treatment in patients with avc with sleep apnea- a preliminary open trial study	Sleep Breath B1	Brunner. 2008	Respiratory disturbance index; Barthel-index	Quantitative
2.Acceptance, efficacy and safety of continuous positive airway pressure in acute stroke: a pilot study	Respir Med A2	Acala *et al.* 2009	Evaluation; Epworth drowsiness scale; Barthel index; modified Rankin scale	Quantitative
3.Comparison of two Headgear systems for treatment of sleep apnea in patients with stroke	Cerebrovasc Dis A2	Brown *et al.* 2009	Rankin scale modified; body mass index	Quantitative
4.Continuous Positive Airway Pressure Treatment Reduces Mortality in Patients with Ischemic Stroke and Obstructive Sleep Apnea A 5-Year Follow-up Study	Am J Respir Crit Care Med A1	Martinez-Garcia *et al. 2009*	Glasgow Coma Scale; protocol; Barthel index; apnea-hypopnea index;	Quantitative
5.Safety and Tolerability of Early Noninvasive Ventilatory Correction Using Bilevel Positive Airway Pressure in Acute Ischemic Stroke	Stroke A1	Georgios *et al.* 2011	*National Institutes of Health Stroke (NIHSS); Epworth Sleepiness Scale*	Quantitative
6.Continuous positive airway pressure: evaluation of a new therapy for patients with acute ischemic stroke	Sleep A1	Bravata *et al.* 2011	*National Institutes of Health Stroke (NIHSS); apnea-hypopnea index.*	Quantitative
7.Continuous positive airway pressure ventilation for acute ischemic stroke: a randomized feasibility study	Stroke A1	Jens *et al.* 2012	*National Institutes of Health Stroke (NIHSS); apnea-hypopnea index*	Quantitative
8.Sleep Apnea Treatment after Stroke (SATS) Trial: Is it feasible?	J Stroke Cerebrovasc Dis B2	Brown *et al. 2013*	Sleep Disorders Questionnaire and Stroke Scale of the National Institute of Health	Quantitative
9.Reversal of the neurological deficit in acute stroke with the signal of efficacy trial of auto-BPAP to limit damage from suspected sleep apnea (Reverse-STEAL): study protocol for a randomized controlled trial.	Trials B1	Kepplinger *et al. 2013*	Berlin Sleep Apnea Questionnaire; National Institutes of Health Stroke (NIHSS)	Quantitative
10. The effect of disordered sleep breathing on the outcomes of stroke and transient ischemic attack: a systematic review	J Clin Sleep Med B1	Birkbak *et al.* 2014	Systematic review Protocol; database	Quantitative

Figure 1. Distribution of selected articles according to established criteria.

Article content

Among the articles selected, they all correlated between stroke and obstructive sleep apnea, thus observing the importance of identifying apnea as a risk factor for stroke, as well as the clinical finding after the stroke episode. CPAP was the ventilatory modality used in eight studies, while BiPAP was used in two studies. In all the articles selected there are descriptions of the benefits of NIV in patients with stroke and obstructive sleep apnea, however, it is still notable the small number of publications related to the topic. Relating the findings to the study, it is observed that all articles deal with obstructive sleep apnea and CPAP as a non-invasive ventilatory modality best suited to the clinical situation.

Obstructive sleep apnea syndrome (OSAS) is considered an independent risk factor for the development of hypertension, with a directly proportional relationship between apnea and hypopnea index (AHI), which reflects the severity of the disease, and the chance of a person becomes hypertensive. Evidence that OSAS is associated with a higher risk of cerebrovascular events is undeniable, so much so that the latest American Heart Association (AHA) guidance included the screening and treatment of OSAS in patients diagnosed with stroke or transient ischemic attack. The exact mechanisms that lead to the presence of OSAS

in favor of stroke are still not fully understood, but with recent studies, there is growing evidence that it can be considered an independent risk factor for the development of cerebrovascular disease.[15]

OSAS contributes to the development of stroke through mechanisms such as: development of systemic arterial hypertension (SAH); increased platelet aggregation; blood hypercoagulability; endothelial dysfunction, among others. In addition, during episodes of apnea, there is a decrease in cerebral blood flow due to low cardiac output, which may predispose individuals at risk for stroke, such as those with atheromatous lesions in the carotid and cerebral circulation. Apnea may also compromise the cognition of patients with prior stroke due to increased daytime sleepiness, concentration deficit, and memory.[16]

Sleep apnea is common after stroke occurring in 60% to 96% of patients. Continuous positive airway pressure (CPAP) safely and effectively treats sleep apnea. Among patients with stroke during rehabilitation, CPAP has been associated with better outcomes (eg, reduced depressive symptoms and improved sense of well-being) with no serious side effects. However, the safety and efficacy of CPAP during the acute stroke period remain unknown.[17]

Nasal CPAP is considered the gold standard in the treatment of OSAS. Although it is an extremely effective treatment, there are problems with adherence to the use of positive pressure devices and their long-term acceptance.[18] Patient adherence to CPAP has been potentiated by follow-up at a CPAP clinic where a health professional, physician, physiotherapist, nurse, speech therapist, among others, provides assistance in adapting to the device. But it is worth mentioning that mortality due to Obstructive Sleep Apnea and Hypopnea Syndrome is reduced effectively with the use of CPAP.[19]

In addition, patients with difficulty adapting to the CPAP device tend to tolerate BiPAP better. About 8.9 to 48% of patients with respiratory sleep disorder have unsatisfactory control of apnea and hypopnea or hypoventilation-related desaturation, despite the use of CPAP. The lack of response to CPAP is predictable in the following situations: morbid obesity due to dyspnea complaint; high percentage of total sleep time with saturation below 90%; altered blood pressure during wakefulness and increased partial pressure of arterial carbon dioxide (PaCO2) after exercise. Patients with such characteristics may benefit from treatment with BiPAP.[20] However, BIPAP has the potential to allow path occlusion during the cycle. This may occur if the pressure programming is below the expiratory occlusion pressure of the.[16]

Year of Publication

It was found that the largest number of publications occurred between 2009, 2011 and 2013, respectively with three, two and two studies. Relating the years of publication, it is possible to indicate that, in the year prior to 2009, that is, in 2008, two Portaria of the Ministry of Health were extremely important: No. 1,370, of July 3, 2008, establishing the program of noninvasive ventilatory assistance to patients with neuromuscular diseases, [21] and that of No. 370, of July 4, 2008, which establishes, under the Unified Health System - UHS, the Noninvasive Ventilatory Assistance Program for Patients with Neuromuscular Diseases considering the need to adopt measures to make feasible the organization and implementation of the program, to define the list of diseases to be contemplated, to establish technical criteria for the implantation of the program and for ventilatory assistance to patients with neuromuscular diseases who need it.[22] And in the year 2011, the Federal Council of Physical Therapy and Occupational Therapy recognized the Professional specialty in Physical Therapy in Therapy Intensive.

Review of Newspapers

As for the journals of the articles selected, the qualis was used, which is a system used to classify the scientific production of the postgraduate programs with regard to the articles published in scientific journals.[24] Among the articles selected, A1 journals were found to B2, being: four of A1 qualis; two A2 periodicals; three B1 journals and one B2 journal, which denotes the quality of the publications. The focus of study is mostly Medicine, and the origin of research is more concentrated on the European continent (six articles), although the country with the largest number of researches is the United States (three publications) and only one article was multicentric involving the European continent and the American continent.

Collection instrument

The instruments of data collection used in the selected articles were: National Institutes of Health Stroke (NIHSS); respiratory distress index; Barthel index; Epworth drowsiness scale; modified Rankin scale; body mass index; Glasgow scale; apnea and hypopnea index and Berlin sleep apnea questionnaire,

all with important information about post-stroke patient functionality, level of consciousness and presence of obstructive sleep apnea, clinical data of great value to the professional physiotherapist in order to assisting in assessing the severity and prognosis of the post-stroke patient, as well as assisting in the indication of noninvasive ventilation. In some studies, more than one.

The National Institutes of Health Stroke (NIHSS) was the most widely used evaluation instrument among the five selected articles. It is used internationally as an indicator of the size and severity of the injury, as well as of the prognosis of stroke patients.[25] The Barthel Index is a ten-question questionnaire used to evaluate basic and instrumental life activities and was applied in three studies.[26] The Epworth Sleepiness Scale assesses the likelihood of the patient falling asleep in certain day-to-day situations being the most widely used method for the subjective assessment of drowsiness severity and was applied in two articles.[27] The Rankin Scale Modified model measures the patient's ability to perform daily life activities and dependence to perform tasks judging the overall ability and need for post-stroke care and has been found in two studies.[28] The apnea-hypopnea index has been applied in three studies and corresponds to the sum of the number of apneas and hypopneas divided by the total hours of sleep. The severity is classified according to the AHI: AHI of 5-15 events / h (mild); IAH of 15-30 events / h (moderate) and AHI> 30 events / h (severe).[29]

Data analysis technique

The results of the selected studies were evaluated in instruments that use numerical values, with the use of validated scales, indices or questionnaires, being the technique of data analysis of quantitative researches in all the material studied. The characteristics of quantitative research are scientific studies with a positivist and logical approach and the knowledge is based on experience / observation and reason.[30]

CONCLUSION

When considering the findings of the research, it was found that there is a relation between obstructive sleep apnea and stroke, even if the mechanism is not fully understood. Noninvasive ventilation and its benefits contribute to the clinical improvement and well-being of patients with or without apnea, as it may present a still more important indication and benefits in early NIV therapy in the optimization, improvement, maintenance and reestablishment of pulmonary function of the elderly after stroke, which, of course, may present, with the aging process, losses or impairment of their respiratory function. Therefore, it is extremely important to observe and evaluate the pulmonary function of the elderly post stroke, since, generally, greater emphasis is given to motor rehabilitation.

The number of publications on physiotherapy related to this subject is low, which requires attention to the importance of further studies in the area. In the studies, a clinical protocol of NIV indication was not observed, which reinforces the importance of the construction and validation of this instrument.

REFERENCES

1. Silva MCL, Polese JC, Starling JMP, Pereira LSM. Clinical and motor functional of hospitalized elderly after Stroke. Rev Neurocienc. 2014; 22(3):337-43. Doi: 10.4181/RNC.2014.22.03.940.7p

2. Brito RG, Lins LCRF, Almeida CDA, Ramos-Neto ES, Araújo DP, Franco CIF. Specific functional assessments for stroke. Rev Neurocienc. 2013; 21(4):593-9. Doi: 10.4181/RNC.2013.21.850.7p

3. Ovando AC, Michaelsen SM, Carvalho T, Herber V. Evaluation of Cardiopulmonary Fitness in Individuals with Hemiparesis after Cerebrovascular Accident. Arq Bras Cardiol [Internet]. 2011 Feb [cited 2018 Mar 15];96(2):140-7. Available from: http://www.arquivosonline.com.br/2011/9602/pdf/9602009.pdf

4. Billinger SA, Coughenour E, Mackay-Lyons MJ, Ivey FM. Reduced cardiorespiratory fitness after stroke: biological consequences and exercise-induced adaptations. Stroke Res Treat. 2012; 2012:959120. Doi: 10.1155/2012/959120

5. Olai L, Borgquist L, Svärdsudd K. Health problems in elderly patients during the first post-stroke year. Ups J Med Sci. 2012 Aug; 117(3):318-27. Doi: 10.3109/03009734.2012.674572

6. Hug A, Mürle B, Dalpke A, Zorn M, Liesz A, Veltkamp R. Usefulness of serum procalcitonin levels for the early diagnosis of stroke-associated respiratory tract infections. Neurocrit Care. 2011 June; 14(3):416-22. Doi: 10.1007/s12028-009-9325-6

7. Pompeu SMAA, Pompeu JE, Rosa M, Silva MR. Correlation between motor function, balance and respiratory muscular strength after Stroke. Rev Neurocienc [Internet]. 2011 [cited 2018 Feb 12]; 19(4):614-20. Available

from: http://www.revistaneurociencias.com.br/edicoes/2011/RN1904/originais%2019%2004/575%20original.pdf

8. Mazullo-Filho JBR, Bonfim VJG, Aquim EE. Noninvasive mechanical ventilation in immediate postoperative cardiac surgery patients. Rev Bras Ter Intensiva. 2010 Oct/Dec; 22(4):363-8. Doi: http://dx.doi.org/10.1590/S0103-507X2010000400009

9. Santiago ICM, Meireles FMS, Kuehner CP, Almeida MA. Knowledge and experience of physiotherapists on non-invasive ventilation. RBPS [Internet]. 2011 July/Sept [cited 2018 Jan 25];24(3):214-20. Doi: http://periodicos.unifor.br/RBPS/article/view/2074/2367

10. Barros LS, Silva VS. Ventilação não invasiva: equipamentos e interfaces. In: Programa de Atualização PROFISIO: fisioterapia em terapia intensiva adulto. Ciclo 2: Módulo 2. Porto Alegre: Artmed; 2010.

11. Cruz MR, Zamora VEC. Noninvasive mechanical ventilation. Revista HUPE. 2013; 12(3):92-101. Doi: 10.12957/rhupe.2013.7535

12. Azeredo CAC. Fisioterapia respiratória moderna. Barueri: Manole; 2002

13. Andrade FMD, Mesquita FOS, Nascimento IMA. Interação paciente ventilador durante a Ventilação não invasiva. In: Programa de atualização PROFISIO: fisioterapia em terapia intensiva adulto. Ciclo 2: Módulo 1. Porto Alegre. Artmed; 2010.

14. Souza MT, Silva MD, Carvalho R. Integrative review: what is it? How to do it? Einstein. 2010 Jan/Mar; 8(1 Pt 1):102-6. Doi: http://dx.doi.org/10.1590/s1679-45082010rw1134.

15. Bahia CMCS, Pereira JS, Brandão A. Obstructive sleep apnea syndrome as an independent risk factor for cerebrovascular disease. Rev HUPE. 2016 Jan/Mar; 15(1):56-60. Doi: 10.12957/rhupe.2016.22375

16. Ferreira PR, Ramos SVS, Silva VF, Teodoro ECM. The role of physical therapy in the syndrome of obstructive sleep apnea and its impact on cardiovascular changes: a literature review. RESC [Internet]. 2015 [cited 2018 Jan 25]; 5(2):60-82. Available from: http://www.rescceafi.com.br/vol5/n2/artigo%205%20pags%2060%20a%2082.pdf

17. Bravata DM, Concato J, Fried T, Ranibar N, Sadarangani T, McClain V. et al. Continuous Positive airway pressure: evaluation of a novel therapy for patients with acute ischemic stroke. Sleep. 2011 Sept; 34(9):1271-7. Doi: 10.5665/SLEEP.1254

18. Dal-Fabro C, Chaves-Junior CM, Bittencourt LRA, Tufik S. Clinical and polysomnographic assessment of the BRD Appliance in the treatment of Obstructive Sleep Apnea Syndrome. Dental Press J Orthod. 2010 Jan/Feb; 15(1):107-17.

19. Brasileiro H. Obstructive Sleep Apnea Syndrome - OSAS. Rev Fac Ciênc Méd [Internet]. 2009 [cited 2018 Feb 15]; 11(1):1-3. Available from: http://revistas.pucsp.br/index.php/RFCMS/article/view/1812/1140

20. Silva GA, Pachilo DV. Therapeutic approach of respiratory sleep disorders treatment with non-invasive ventilation (CPAP, BiPAP and AUTO-CPAP). Medicina [Internet]. 2006 Apr/June [cited 2018 Jan 21];39(2):212-7. Available from: http://revista.fmrp.usp.br/2006/vol39n2/6_cpap_bipap_e_auto-cpap.pdf

21. Ministério da Saúde (BR), Gabinete do Ministro. Portaria GM/MS nº 1.370, de 03 de junho de 2008, que institui, no âmbito do Sistema Único de Saúde - SUS, o Programa de Assistência Ventilatória Não Invasiva aos Portadores de Doenças Neuromusculares [Internet]. Brasília: Ministério da Saúde; 2008 [cited 2018 Jan 15]. http://bvsms.saude.gov.br/bvs/saudelegis/gm/2008/prt1370_03_07_2008.html

22. Ministério da Saúde (BR), Gabinete do Ministro. Portaria GM/MS nº 370, de 04 de julho de 2008, que institui, o rol de doenças neuromusculares incluídas no Programa de Assistência Ventilatória Não Invasiva aos Portadores de Doenças Neuromusculares [Internet]. Brasília: Ministério da Saúde; 2008 [cited 2018 Jan 15]. Available from: http://bvsms.saude.gov.br/bvs/saudelegis/sas/2008/prt0370_04_07_2008.html

23. Conselho Federal de Fisioterapia e Terapia Ocupacional. Resolução nº 402 de 03 de agosto de 2011. Disciplina a Especialidade Profissional Fisioterapia em Terapia Intensiva e dá outras providências [Internet]. Brasília: CREFITO; 2011 [cited 2018 Jan 25]. Available from: http://www.crefito3.org.br/dsn/pdfetica/Res%20Coffito%20402%20-%2003-08-2011-%20Intensiva.pdf

24. Ministério da Educação (BR), Coordenação de Aperfeiçoamento de Pessoal de Nível Superior. Ofício Circular nº 22/2015 – DAV/CAPES [Internet]. Brasília: CAPES; 2015 [cited 2018 Feb 16]. Available from: http://uploads.capes.gov.br/files/OficioCircular22_DAV-DivulgacaoQualis.pdf

25. Brito RG, Lins LCRF, Almeida CDA, Ramos-Neto ES, Araújo DP, Franco CIF. Specific

functional assessments for stroke. Rev Neurocienc. 2013; 21(4):593-9. Doi: 10.4181/RNC.2013.21.850.7p

26. Trindade APNT, Barboza MA, Oliveira FB, Borges APO. Influence of symmetry and transfer of weight in the motor aspects after stroke. Rev Neurocienc [Internet]. 2011 [cited 2018 Jan 15]; 19(1):61-7. Available from: http://www.revistaneurociencias.com.br/edicoes/2011/RN1901/original/480%20original.pdf

27. Guimarães C, Martins MV, Rodrigues LV, Teixeira, F, Santos JM. Epworth Sleepiness Scale in obstructive sleep apnea syndrome – an underestimated subjective scale. Rev Port Pneumol. 2012 Nov/Dec; 18(6):267-71. Doi: https://doi.org/10.1016/j.rppneu.2012.04.009

28. Bahia MM, Chun RYC. Quality of life in aphasia: differences between fluent and non-fluent aphasic Augmentative and Alternative Communication users. Audiol Commun. 2014 Oct/Dec; 19(4):352-9. Doi: http://dx.doi.org/10.1590/S2317-64312014000300001353

29. Musman S, Passos VMA, Silva IBR, Barreto SMB. Avaliação de um modelo de predição para apneia do sono em pacientes submetidos à polissonografia. J Bras Pneumol. 2011 Jan/Feb; 37(1):75-84. Doi: http://dx.doi.org/10.1590/S1806-37132011000100012

30. Pereira KR, Miclos PV. Quantitative and qualitative research: integration of scientific knowledge. Sau & Transf Soc [Internet]. 2013 [cited 2018 Jan 25]; 4(1):16-8. Available from: http://incubadora.periodicos.ufsc.br/index.php/saudeetransformacao/article/view/1430/2455

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