

140 - SLEEP DISORDERS IN CHILDREN WITH CEREBRAL PALSY: SYSTEMATIC REVIEWGECIELY MUNARETTO FOGAÇA DE ALMEIDA¹;SIMONE KÖCHE MACHADO²;RACHEL SCHLINDWEIN-ZANINI³;SANDROVAL FRANCISCO TORRES⁴;FERNANDA SIMÕES VIEIRA GUIMARÃES TORRES⁵

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INTRODUCTION

Studies show that a night of adequate sleep is important for physical recovery of any individual and sleeping is of extreme importance for the physical and cognitive development. Moreover, the consolidation of some types of memory occurs during sleep (TOGEIRO and SMITH, 2005; TUFIK, 2008, MORAN et al, 2005).

Sleep disorders are common phenomena in healthy children, and particularly important in those with some kind of dysfunction. They can be influenced by hereditary, cultural, pharmacological, psychosocial and ambient factors (TIETZE et al, 2012; POTASZ et al, 2010). Sleep Disorders (SD) are frequent in childhood and can influence the behavior, learning, school performance and family relationship of the child, so its recognition is important for an accurate clinical handling of the patient (ALMEIDA, NUNES, SCHLINDWEIN-ZANINI, 2014). Tufik (2008) calculates that the majority of the children with serious impairment show some sleep disorders because sleep problems are related to the general impairment of the central nervous system and the reduction of the capacity to perceive and to interpret the ambient and social stimulations.

Blankenburg et al (2013) shows in his study that the majority of the children with some psychomotor difficulty, suffers from severe sleep disorders. Psychomotor deficiencies are associated with multiple deficiencies, which include neurological injuries (as the cerebral palsy), neuromuscular diseases (as Duchenne muscular dystrophy), neurovegetative diseases (as leucodystrophie) and metabolic diseases (as mucopolysaccharidosis). Sleep disorders can occur associated with any type of injury in the places related to sleep-wake regulation and REM-NREM cycles (NUNES, 2002).

Cerebral Palsy (CP) is a neurological disorder, characterized by sensory-motor dysfunction originated from non-progressive injuries that occur in the brain in the structural and functional maturation phase of the early life. Amongst the most frequent types of CP, is the Spastic (characterized by paralysis and increase of muscle tone), that can be associated with hemiparesis, tetraparesis, or diplegia (which is a result of injury in the motor cortex), the Extrapyramidal (dystonia, with involuntary movements and variations in muscle tonus that are results of injuries of the internal nuclei of the cerebral hemispheres, as Extrapyramidal and base nuclei), and Ataxic (marked by the reduction of muscle tone, movement incoordination and deficient balance, as a result of cerebellum or cerebellar paths' injury). In the majority of the cases, the CP is followed by neuropsychological and social disorders (MELLO et al, 2012; DANTAS et al, 2010).

Newman et al (2006) note that the difficulty in falling sleep and keeping asleep, the sleep-awake cycle and the sleep-disordered breathing are the most frequent problems in children with cerebral palsy. Confirming these findings, Potasz et al (2010); Sinha and Guilleminault (2010); Moran (2005); Nunes and Cavalcante (2005) and Ferreira et al (2009), say that the most common sleep disorders in children with psychomotor deficiency are sleep-disordered breathing, difficulty in falling sleep and keeping asleep, disorders in the sleep-awake cycle, and, as well, excessive daytime sleepiness, somniloquy (sleep-talking), nightmares, bruxism (grinding or clenching teeth during sleep) and snore.

The knowledge and importance of sleep problems in children with cerebral palsy cannot be ignored because they can harm other aspects of the neuropsychomotor development of these children. In this regard, Fonseca (2011) and Zanini, Cemin e Peralles (2009) mention that the prevalence in developed countries varies between 1.5 the 5.9/1.000 live births, knowing that the incidence of CP in developing countries is of 7 on 1.000 live births. This study had as objective to systemize scientific evidences related the sleep disorders in children with Cerebral Palsy.

METHOD

Systematic review study was made with the objective of identifying studies that approach sleep disorders in children with cerebral palsy. The bibliographical search was lead in the month of April of 2014 in the databases Medline/Pubmed, Scielo, LILACs and PEDro. As search strategy, we used the keywords: "sleep disorders", combined with "children" and "cerebral palsy".

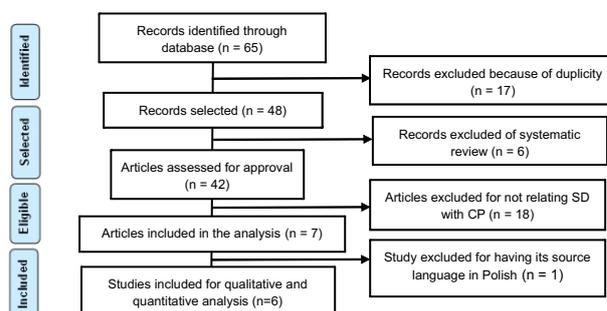
We considered the studies that were published in Brazilian Portuguese, English or Spanish. The content was analyzed and those with the following criteria of inclusion were selected: a) The article's title makes reference of sleep disorders in child with cerebral palsy; b) studies published after 2004. We excluded the review studies or those that didn't directly approach sleep disorders and child with cerebral palsy.

The articles were completely analyzed by means of a structuralized script the following elements: year, instrument of sleep evaluation, main results and conclusions.

RESULTS

We initially identified 65 articles, but only 6 were adequate to the inclusion criteria. An article was excluded for being in Polish. Figure 1 shows the flowchart of articles searched.

FIGURE 1 - FLOW DIAGRAM (PRISMA, 2009).



Amongst the selected studies, three showed the highest incidence of sleep disorders in children with cerebral palsy (ATMAWIDJAJA et al, 2014; ROMEO et al, 2014; WAYTE et al, 2012), three articles showed differences between the group with cerebral palsy and the control group (which presented the poorest quality of life in children with CP and their families (SANDELLA et al, 2011; ROMEO et al, 2014; ATMAWIDJAJA et al, 2014), and two studies suggested that the surgical treatment for Obstructive Sleep Apnea Syndrome is efficient for children with CP (HSIAO et al, 2008; HARTZELL et al, 2013).

DISCUSSION

The results of this bibliographical review demonstrate that children with cerebral palsy (CP) seem to have more sleep problems than children with normal development. This result is echoed by the study of Fitzgerald et al (2009), that shows that sleep disorders (SD) are a common problem in children with CP, mainly for affecting the musculoskeletal system and upper respiratory tract.

Hsiao and Nixon (2008), Hartzell et al (2013) and Wayte et al (2012) report that children with CP possess increased risk of developing Obstructive Sleep Apnea Syndrome (OSAS) because of the reduction of neuromuscular control of the upper respiratory tract. Atmawidjaja et al (2014) and Romeo et al (2014) used the Sleep Disturbances Scale for Children (SDSC) and the falling sleep and keeping asleep Sleep Disorder was the most found followed by Sleep-disordered breathing (SDB).

Sandella et al (2011) used the Pediatric Sleep Questionnaire (PSQ) in his study and the SDB variables in the group with CP were higher than the group of normal development. Hsiao et al (2008) used OSA-18, that evaluates the impact of OSAS in quality of life (QL) related to health. The score of the sample was high, indicating great impact in the QL related to health. Wayte et al (2012) evaluated the clinical symptoms of the SD in children in school age through the Child Sleep Habits Questionnaire (CSHQ). The score of children with CP was higher than the control group's one.

In his review article, Simard-Tremblay et al (2011) concluded the consensus about the best SD treatment isn't established for this population. However, the consequences of sleep disorders for the child and their family are extensive and well established.

Even though there is research showing the prevalence of sleep disorders in children with CP, three of the studies analyzed agree that there are few people who address SD and CP. The data are limited and few studies assess the problems in these children (Sandella et al, 2011, Romeo et al, 2014, and Wayte et al, 2012). Only two of the studies evaluated the treatment for a specific SD (Obstructive Sleep Apnea Syndrome) in children with CP, and both stated improvement in the group "treatment", however the therapy used in the studies was surgical (Hsiao et al, 2008 and Hartzell et al, 2013).

Sinha and Guillemainault (2010) reported that the tonsillectomy/amygdalectomy and adenoidectomy (T & A) are the most used procedures for treating SDB. The studies of Hsiao et al (2008) and Hartzell et al (2013), agree that the surgical treatment is efficient, however they report that the treatment by itself doesn't resolve the problem and mention, as well, the CPAP as a therapeutic technique for this problem.

Sandella et al (2011), Romeo et al (2014) and Atmawidjaja et al (2014), comment that children with CP have increased risk of sleep disorders. According to Romeo et al (2014), this increase can be related to the muscle spasms, musculoskeletal pain and epilepsy. Validating this, Atmawidjaja et al (2014) say that epilepsy is strongly linked to DS in this population, besides blindness or serious visual deficiency, upper respiratory tract abnormalities, possible primary alterations in the sleep architecture and central apnea related to brainstem dysfunction. Wayte et al (2011), report that children with CP have multiple risk factors for SD due to the nature of its primary cerebral injury.

The study of Fitzgerald et al (2009) emphasizes the prevalence of sleep respiratory problems, and mentions that the disruption of sleep standards can have great impact in the interactive and cognitive abilities of children with CP, affecting their life quality and their families'. Afterwards, Tietze et al (2012) found three studies that analyzed sleep in children with CP. In these, the main SD detected were difficulty in falling sleep and staying asleep, SDB and problems to wake up.

For Blankenburg et al (2013), sleep disorders in children with serious psychomotor deficiency aren't many times adequately evaluated or treated. Research on the prevalence, kind, gravity or consequence of sleep disorders in these children is scarce. Tietze et al (2012) says that the lack of research exists due to the difficulty in choosing a validated and trustworthy instrument that evaluates the SD in this specific population.

Table 1 shows the articles analyzed in this research, emphasizing the year of publication, number of the sample, age of the sample, the instruments used in each study to evaluate sleep, the main results and conclusions.

Table 1: Studies analyzed on sleep disorders related to the cerebral palsy.

YEAR	AUTHOR	COUNTRY	DISORDER	n	AGE	INSTRUMENT	RESULTS	CONCLUSIONS
2008	Hsiao, Nixon.	NZ	OSA in QL	19	3-18	OSA-18 Quality-of-Life Questionnaire	The parents reported improvement in the SD of the children after OSAS treatment	OSAS significantly affects QL of children with CP and of their parents.
2011	Sandella et al.	U.S.A.	SD and QL	132	8-16	Pediatric Sleep Questionnaire (PSQ)	Reported differences between the groups (CP x DT) in the effect of SD and QL	Reported the importance of SD when approaching patients with CP.
2012	Wayte et al.	UK	SD in CP	40	4-12	Child Sleep Habits Questionnaire (CSHQ)	Children with CP had presented worse symptoms.	Children with CP have more sleep problems.
2013	Hartzell et al.	U.S.A.	TBS, SAOS in CP	14	0-18	-	Suggests that surgical treatment of SBL is efficient in serious cases.	Surgery for moderate to serious OSAS can benefit children with CP in a safe way.
2014	Atmawidjaja et al.	Malaysia	SD in CP	109	4-18	Sleep Disturbance Scale for Children (SDSC)	Children with CP presented higher average scores for	SD are more common in children with CP than in children with normal development.
2014	Romeo et al.	Italy	SD in CP	165	6-16	Sleep Disturbance Scale for Children (SDSC)	More than 40% of the children with CP had had abnormal score.	SD are common in children with CP.

Key to table: SD - Sleep Disorders; OSAS - Obstructive Sleep Apnea Syndrome; CP - cerebral palsy; ND - typical development; QL - quality of life; TBS - Tongue Base Suspension

CONCLUSION

Sleep disorders in children with cerebral palsy are common; however the studies that explore these problems in this population are still few. It deserves more focus in its physiotherapeutic, psychological/neuropsychological and medical approach even though such alterations reverberate in sleep hygiene of the caretakers of these patients, and, consequently, in the quality of life of the family.

The few existing studies do not specify a disorder; they only mention the results, in which we can find the predominance of sleep-disordered breathing. Research on physiotherapeutic treatment for SD in children with cerebral palsy was not found. Little attention has yet been paid to this type of intervention for this population.

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SLEEP DISORDERS IN CHILDREN WITH CEREBRAL PALSY: SYSTEMATIC REVIEW.

ABSTRACT

Introduction: An adequate night of sleep is basic for the motor and cognitive development. Recent studies report that children with Cerebral Palsy (CP) have a greater risk for developing sleep disorders (SD) with predominance of obstructive sleep apnea syndrome, difficulty to fall sleep and difficulty to stay asleep and sleep-disordered breathing. The CP is actually a group of disorders in the development of the motor and postural control which emerges from a non-progressive damage in the development of the central nervous system and it may be related to cognitive deficit. **Objective:** To organize scientific evidences related with sleep disorders in children with cerebral palsy. **Method:** searches in the databases Scielo, Pubmed/Medline, Lilacs and PEDro, using the word-keys: "sleep disorders", combined with "children" and "cerebral palsy". Studies published in the last 10 years in Portuguese, English or Spanish and that related SD and CP had been considered. Review studies or those that didn't directly approach sleep disorders related to cerebral palsy had been excluded. The articles were completely analyzed by means of a structuralized script. **Results:** 65 articles were initially identified, but only 6 were adequate for the inclusion criteria. Amongst them, three had the higher incidence of sleep disorders in children with cerebral palsy and three showed lesser quality of life in the group with cerebral palsy. **CONCLUSION** Although it is known that SD are common in children with CP, few studies exist that explore these problems in this specific population.

KEYWORDS: sleep disorders, children, cerebral palsy.

TROUBLES DU SOMMEIL CHEZ LES ENFANTS SOUFFRANT D'UNE PARALYSIE CÉRÉBRALE: REVUE SYSTÉMATIQUE.**RÉSUMÉ**

Introduction: Une nuit de sommeil adéquate est fondamentale pour le développement moteur et cognitif. Des études récentes montrent que les enfants souffrant d'une paralysie cérébrale (PC) présentent un risque plus important de développer des troubles du sommeil, une prédominance à l'apnée obstructive du sommeil, une difficulté à commencer à dormir ou à rester endormi et des troubles respiratoires du sommeil. La PC se réfère à un ensemble de troubles dans le développement moteur et postural, venant d'une lésion non progressive dans le développement du système nerveux central, pouvant être lié à un préjudice cognitif. Obejctif: systématiser les preuves scientifiques liées aux troubles du sommeil chez les enfants souffrant d'une paralysie cérébrale. Méthode: chercher dans les bases de données Scielo, Pubmed/Medline, Lilacs et PEDro en utilisant les mots clés : "troubles du sommeil", associé à "enfants" et à "paralysie cérébrale". Ont été prises en compte des études publiées en portugais, anglais ou espagnol , durant les 10 dernières années et qui ont un rapport avec les TS et la PC. Ont été exclues des études en révision ou qui n'abordaient pas directement les troubles du sommeil liés à la paralysie cérébrale . Les articles ont été analysés dans leur intégralité de façon structurée. Résultat: 65 articles ont été initialement identifiés mais seulement 6 correspondent aux critères d'inclusion. Parmi eux, 3 mettent en évidence la plus grande incidence des troubles du sommeil chez les enfants souffrant d'une paralysie cérébrale et 3 montrent une qualité de vie inférieure dans le groupe ayant une paralysie cérébrale. Conclusion : Bien qu'il soit connu que les TS soient communs chez les enfants souffrant d'une PC, il existe peu d'études qui explorent ces problèmes sur une population spécifique.

MOTS-CLÉS: troubles du sommeil, enfants, paralysie cérébrale.

TRASTORNOS DEL SUEÑO EN NIÑOS CON PARÁLISIS CEREBRAL: REVISIÓN SISTEMÁTICA.**RESUMEN**

Introducción: Una noche de sueño adecuada es fundamental para el desarrollo motor y cognitivo. Estudios recientes relatan que niños con Parálisis Cerebral (PC) tienen mayor riesgo de desarrollar trastornos de sueño (DS), predominando apnea obstructiva del sueño, dificultad en iniciar y mantener el sueño, y trastornos respiratorios de sueño. La PC se refiere a un grupo de trastornos en el desarrollo del control motor y postural, derivado de una lesión no progresiva en ocasión de desarrollo del sistema nervioso central, pudiendo relacionarse al prejuicio cognitivo. Objetivo: Sistematizar evidencias científicas, relacionadas a trastornos de sueño en niños con parálisis cerebral. Método: Búsqueda en las bases de datos Scielo, Pubmed/Medline, Lilacs y PEDro, utilizando las palabras clave: "trastornos de sueño" combinada con "niños" y "parálisis cerebral". Fueron considerados estudios publicados en portugués, inglés o español; en los últimos 10 años y que relacionasen DS y PC. Fueron excluidos estudios de revisión, o que no abordasen directamente trastornos de sueño relacionados a parálisis cerebral. Los artículos fueron analizados íntegramente por medio de una guía estructurada. Resultados: Fueron identificados inicialmente 65 artículos, pero sólo 6 se adecuaron a los criterios de inclusión. Entre ellos, tres destacan mayor incidencia de trastornos de sueño en niños con parálisis cerebral, y tres relatan menor calidad de vida en el grupo con parálisis cerebral. Conclusión: Aunque se conozca que DS son comunes en niños con PC, existen pocos estudios que exploran estos problemas, en esta población específica.

PALABRAS CLAVE: trastornos de sueño, niños, parálisis cerebral.

DISTÚRBIOS DO SONO EM CRIANÇAS COM PARALISIA CEREBRAL: REVISÃO SISTEMÁTICA.**RESUMO**

Introdução: Uma noite de sono adequado é fundamental para o desenvolvimento motor e cognitivo. Estudos recentes relatam que crianças com Paralisia Cerebral (PC) tem maior risco de desenvolver distúrbios do sono (DS), predominando apnéia obstrutiva do sono, dificuldade de iniciar e manter o sono e distúrbios respiratórios do sono. A PC refere-se a um grupo de distúrbios no desenvolvimento do controle motor e postural, decorrente de uma lesão não progressiva na ocasião do desenvolvimento do sistema nervoso central, podendo relacionar-se ao prejuízo cognitivo. Objetivo: Sistematizar evidências científicas relacionadas a distúrbios do sono em crianças com paralisia cerebral. Método: busca nas bases de dados Scielo, Pubmed/Medline, Lilacs e PEDro, utilizando as palavras-chave: "distúrbios do sono", combinado com "crianças" e "paralisia cerebral"; "sleep disorders" combinada com "child" e "cerebral palsy"; "trastornos del sueño" combinada com "niño" e "parálisis cerebral". Foram considerados estudos publicados em português, inglês ou espanhol; nos últimos 10 anos e que relacionassem DS e PC. Foram excluídos estudos de revisão ou que não abordassem diretamente distúrbios do sono relacionados à paralisia cerebral. Os artigos foram analisados na íntegra por meio de um roteiro estruturado. Resultados: Foram identificados inicialmente 65 artigos, mas apenas 6 adequaram-se aos critérios de inclusão. Dentre eles, três destacam a maior incidência de distúrbios do sono em crianças com paralisia cerebral e três relatam menor qualidade de vida no grupo com paralisia cerebral. Conclusão: Embora seja conhecido que DS são comuns em crianças com PC, existem poucos estudos que exploram estes problemas nesta população específica.

PALAVRAS-CHAVE: distúrbios do sono, crianças, paralisia cerebral.