PATERNAL SHIFT-WORKING AND SLEEP DISORDERS IN CHILDREN AFFECTED BY PRIMARY NOCTURNAL ENURESIS

LUCIA PARISI[1], MARGHERITA SALERNO[2], AGATA MALTESE[1], GABRIELE TRIPI[3,4], PALMIRA ROMANO[5], ANNABELLA DI FOLCO[1], TERESA DI FILIPPO[1], MICHELE ROCCELLA[1]

[1]Department of Psychological, Pedagogical and Educational Sciences, University of Palermo, Italy - [2]Sciences for Mother and Child Health Promotion, University of Palermo, Italy - [3]Department PROSAMI, University of Palermo, Italy - [4]Childhood Psychiatric Service for Neurodevelopmental Disorders, CH Chinon, France - [5]Clinic of Child and Adolescent Neuropsychiatry; Department of Mental Health and Physical and Preventive Medicine, Università degli Studi della Campania-Luigi Vanvitelli, Italy

ABSTRACT

Objectives*: Primary monosymptomatic nocturnal enuresis (PMNE) is a common problem in childhood and studies about the sleep habits of affected children are not conclusive. Work-family conflict (WFC) results from the incompatibility between family demands and business/workplace needs. WFC can impact parental quality with many consequences on children health. Aim of study is assessing the prevalence of sleep disturbances in enuretic children, sons of work-shifters.*

Materials and methods*: 80 children (67 males) aged 5-13 years (mean 10,43; SD ± 1,99), were consecutively referred for PMNE. Sleep habits were investigated with Sleep Disturbances Scale for Children (SDSC) and the results were compared with a control group of 255 (190 males) typical developing children (TDC) sons of no shift-workers, matched for age (mean 10.57 SD ± 1,89; p = 0.569) and sex distribution (Chi-square= 2.416; p = 0.120).*

Results*: To evaluate statically differences among mean values of two samples, the Chi-square test was performed. Logistic regression was assessed to verify the role of paternal shift-working as risk factor for sleep disorders. p≤0.05. All sleep disturbances categories were more prevalent in PMNE children sons of shift-workers than control group (Chi-square= 43.926; p<0.001); particularly 82.5% of PMNE vs. 11.76% of TDC show pathological scores for SBD category (Chi-square = 145.592; p<0.001; OR = 35,35; IC95% = 17.71-70.57); 61.25% vs 9.41% for SWTD (Chi-square = 93; p < 0.001; OR = 15.213; IC95% = 8.21-28.15); 57.5% vs 9.41% for DA (Chi-square = 82.31; p < 0.001; OR = 13.02; IC95% = 7.06-23.98); 37.5% vs 6.67% for DIMS (Chi-square = 45.476; p < 0.001; OR = 8,4; IC95% = 4.3-16.39); 26.25% vs 5.88% for SHY (Chi-square = 24.257; p < 0.001; OR = 5.69; IC95% = 2,76-11,71) and 25%c vs 5.49% for DOES (Chi-square = 23.323; p < 0.001; OR = 5,73; IC95% = 2,73-12,01).*

Conclusions*: Our findings suggest that paternal shif-working plus PMNE children may be a relevant factor affecting sleep quality in affected children.*

Keywords*: Primary nocturnal enuresis, paternal shift-working, SDSC.*

DOI: 10.19193/0393-6384_2017_3_071

Received *November 30, 2016;* ***Accepted*** *February 02, 2017*

Introduction

Primary monosymptomatic nocturnal enuresis (PMNE) is a very common disorder in developmental age with a prevalence of 10.6% of subjects over 5 years of age, particularly among males respect of females, and sometimes persisting until adolescence. Generally, PMNE is defined as the not voluntary urine loss during the night in children over almost 5 years of age[1-9].

Work-family conflict results from the incompatibility between family demands and business/workplace needs, situation experienced by the worker as a significant stress cause and affecting quality of life and parental quality/efficacy. As coded by specific literature, the most relevant cause for work-family conflict derives from shift working[1-12].

Aim of the present study is verifying the prevalence of children with primary nocturnal enuresis (PMNE) among children of shift workers.

Materials and methods

80 children (67 males) aged 5-13 years (mean age 10.43; SD ± 1.99) affected by PMNE (≥3 episodes per week) and sons of shift-workers were recruited.

Exclusion criteria were the following: overweight (z-BMI> 85 pc) and obesity (z-BMI > 95 pc), cognitive disability (IQ <70), neurological disorders (ie headaches, epilepsy), chromosomal syndromes (eg. Down, Prader-Willi, Crouzon, Pierre-Robin, trisomy 18), psychiatric illness (ie. mood disorders, anxiety disorders, psychosis) and specific neuropsychological disorders[13-38].

The control population consisting of 255 typical developing children (TDC) sons of non shift-workers (190 males) similar for age (mean 10.57, SD ± 1.89; p = 0.569) and gender (Chi-square= 2.416; p = 0.120).

Sleep habits assessment

To evaluate sleep habits and disturbances, all of the subjects' mothers filled-out the Sleep Disturbances Scale for Children (SDSC), a standardized questionnaire for the assessment of sleep problems during development, consisting of 26 items grouped into six subscales: Disorders in Initiating and Maintaining Sleep (DIMS), Sleep Breathing Disorders (SBD), Disorders of Arousal (DA), Sleep-Wake Transition Disorders (SWTD), Disorders Of Excessive Somnolence (DOES), and Nocturnal Hyperhidrosis (SHY).

Results

Table 1 shows the differences in percentages for pathological SDSC subscales scores among the both group (PMNE sons of shift-workers and TDC sons of non shift-workers).

Discussion

PMNE is one of the most common and disabling developmental problem, impacting different functioning of day-life areas and quality of life.

About the PMNE role in sleep habits dysregulation, affected children may present a different representation of early stages of NREM sleep, associated with the presence of numerous cortical aruosal characterized, however, by the inability of subjects to behavioral awakening real. In this light, also disturbing psychological factors as the systematic and regular father absence during night may contribute to worse the sleep quality of PMNE children[39-42].

In fact, although all categories of sleep disorders are prevalent in PMNE subjects, also the DA scale is strongly different. DA scale explores the presence of parasomnias, such as sleepwalking and sleep terrors, nocturnal episodes that may be also related to psychological troubles such as internalizing problems. These disorders may be more prevalent in psychological disturbed situation such as parent death, institutionalization, lack of one parent during the night, even if further research are needed[43-50].

	PMNE (n=80)%	TDC (n = 255)%	Chi-square	OR	95%IC	p
DIMS	37,5	6,67	45,476	8,4	4,30 - 16,39	<0,001
SBD	82,5	11,76	145,592	35,35	17,71 - 70,57	<0,001
DA	57,5	9,41	82,310	13,02	7,06 - 23,98	<0,001
SWTD	61,25	9,41 0	93	15,21	8,21 - 8,15	<0,001
DOES	25	5,49	23,323	5,73	2,73 - 12,01	<0,001
SHY	26,25	5,88	24,257	5,69	2,76 - 11,71	<0,001
SDSC TOT	21,25	0,78	43,926	34,13	7,68 - 151,6	<0,001

Table 1: shows the comparison for percentages (%) of pathological scores between the two population of children (Primary nocturnal enuresis; PMNE and typical developing children; TDC) for assessment with Sleep Disturbance Scale for Children test (SDSC) subscales: DIMS, Disorders in Initiating and Maintaining Sleep; SBD, Sleep Breathing Disorders; DA, Disorders of Arousal; SWTD, Sleep-Wake Transition Disorders; DOES, Disorders Of Excessive Somnolence; SHY, Nocturnal Hyperhidrosis. t-test was performed when appropriated.

p values ≤ 0.05 were considered as statistical significant.

References

1) Carotenuto M, Esposito M. Nutraceuticals safety and efficacy in migraine without aura in a population of children affected by neurofibromatosis type I. Neurol Sci. 2013 Nov; 34(11):1905-9. doi: 10.1007/s10072-013-1403-z;
2) Perillo L, Esposito M, Caprioglio A, Attanasio S, Santini AC, Carotenuto M. Orthodontic treatment need for adolescents in the Campania region: the malocclusion impact on self-concept. Patient Prefer Adherence. 2014 Mar 19; 8: 353-9. doi: 10.2147/PPA.S58971;
3) Carotenuto M, Gimigliano F, Fiordelisi G, Ruberto M, Esposito M. Positional abnormalities during sleep in children affected by obstructive sleep apnea syndrome: the putative role of kinetic muscular chains. Med Hypotheses. 2013 Aug; 81(2): 306-8. doi: 10.1016/j.mehy.2013.04.023;
4) Esposito M, Carotenuto M. Intellectual disabilities and power spectra analysis during sleep: a new perspective

on borderline intellectual functioning. J Intellect Disabil Res. 2014 May; 58(5): 421-9. doi: 10.1111/jir.12036;

5) Esposito M, Parisi P, Miano S, Carotenuto M. Migraine and periodic limb movement disorders in sleep in children: a preliminary case-control study. J Headache Pain. 2013 Jul 1; 14: 57. doi: 10.1186/1129-2377-14-57

6) Carotenuto M, Esposito M, Pascotto A. Migraine and enuresis in children: An unusual correlation? Med Hypotheses. 2010 Jul; 75(1): 120-2. doi: 10.1016/j.mehy.2010.02.004;

7) Carotenuto M, Gallai B, Parisi L, Roccella M, Esposito M. Acupressure therapy for insomnia in adolescents: a polysomnographic study. Neuropsychiatr Dis Treat. 2013; 9: 157-62. doi: 10.2147/NDT.S41892

8) Esposito M, Gallai B, Parisi L, Roccella M, Marotta R, Lavano SM, Gritti A, Mazzotta G, Carotenuto M. Maternal stress and childhood migraine: a new perspective on management. Neuropsychiatr Dis Treat. 2013;9:351-5. doi: 10.2147/NDT.S42818

9) Carotenuto M, Esposito M, Precenzano F, Castaldo L, Roccella M. Cosleeping in childhood migraine. Minerva Pediatr. 2011 Apr; 63(2): 105-9

10) Esposito M, Carotenuto M, Roccella M. Primary nocturnal enuresis and learning disability. Minerva Pediatr. 2011 Apr; 63(2): 99-104

11) Esposito M, Roccella M, Parisi L, Gallai B, Carotenuto M. Hypersomnia in children affected by migraine without aura: a questionnaire-based case-control study. Neuropsychiatr Dis Treat. 2013;9:289-94. doi: 10.2147/NDT.S42182

12) Esposito M, Pascotto A, Gallai B, Parisi L, Roccella M, Marotta R, Lavano SM, Gritti A, Mazzotta G, Carotenuto M. Can headache impair intellectual abilities in children? An observational study. Neuropsychiatr Dis Treat. 2012; 8: 509-13. doi: 10.2147/NDT.S36863

13) Esposito M, Gallai B, Parisi L, Roccella M, Marotta R, Lavano SM, Mazzotta G, Patriciello G, Precenzano F, Carotenuto M. Visuomotor competencies and primary monosymptomatic nocturnal enuresis in prepubertal aged children. Neuropsychiatr Dis Treat. 2013; 9: 921-6. doi: 10.2147/NDT.S46772;

14) Precenzano F, Ruberto M, Parisi L, Salerno M, Maltese A, Vagliano C, Messina G, Di Folco A, Di Filippo T, Michele Roccella. Executive functioning in preschool children affected by autism spectrum disorder: a pilot study. Acta Medica Mediterranea, 2017, 33: 35-39; DOI: 10.19193/0393-6384_2017_1_005;

15) Precenzano F, Lombardi P, Ruberto M, Parisi L, Salerno M, Maltese A, D'alessandro I, Della Valle I, Magliulo RM, Messina G, Roccella M. Internalizing symptoms in children affected by childhood absence epilepsy: a preliminary study. Acta Medica Mediterranea, 2016, 32: 1749-1753; DOI: 10.19193/0393-6384_2016_6_158;

16) Precenzano F, Ruberto M, Parisi L, Salerno M, Maltese A, D'alessandro I, Della Valle I, Visco G, Magliulo RM, Messina G, Roccella M. ADHD-like symptoms in children affected by obstructive sleep apnea syndrome: a case-control study. Acta Medica Mediterranea, 2016, 32: 1755-1759; DOI: 10.19193/0393-6384_2016_6_159;

17) Precenzano F, Ruberto M, Parisi L, Salerno M, Maltese A, D'alessandro I, Grappa MF, Magliulo RM, Messina G, Roccella M. Borderline intellectual functioning and parental stress: an italian case-control study. Acta Medica Mediterranea, 2016, 32: 1761-1765; DOI: 10.19193/0393-6384_2016_6_160;

18) Ruberto M, Precenzano F, Parisi L, Salerno M, Maltese A, Messina G, Roccella M. Visuomotor integration skills in children affected by obstructive sleep apnea syndrome: a case-control study. Acta Medica Mediterranea, 2016, 32: 1659; DOI: 10.19193/0393-6384_2016_5_146;

19) Parisi L, Ruberto M, Precenzano F, Di Filippo T, Russotto C, Maltese A, Salerno M, Roccella M. The quality of life in children with cerebral palsy. Acta Medica Mediterranea, 2016, 32: 1665; DOI: 10.19193/0393-6384_2016_5_147;

20) Epifanio, M.S., Genna, V., De Luca, C., Roccella, M., La Grutta, S. Paternal and maternal transition to parenthood: The risk of postpartum depression and parenting stress (2015) Pediatric Reports, 7 (2), pp. 38-44

21) Parisi, L., Di Filippo, T., Roccella, M. The child with Autism Spectrum Disorders (ASDS): Behavioral and neurobiological aspects. Acta Medica Mediterranea, 2015, 31 (6), pp. 1187-1194;

22) Vecchio, D., Salzano, E., Vecchio, A., Di Filippo, T., Roccella, M. A case of femoral-facial syndrome in a patient with autism spectrum disorders. Minerva Pediatrica, 2011, 63 (4), pp. 341-344;

23) Parisi, L., Di Filippo, T., Roccella, M. Hypomelanosis of Ito: Neurological and psychiatric pictures in developmental age. Minerva Pediatrica, 2012, 64 (1), pp. 65-70;

24) Di Filippo, T., Parisi, L., Roccella, M. Psychological aspects in children affected by duchenne de boulogne muscular dystrophy. Mental Illness, 2012, 4 (1), pp. 21-24;

25) Epifanio MS, Genna V, Vitello MG, Roccella M, La Grutta S. Parenting stress and impact of illness in parents of children with coeliac disease. Pediatr Rep. 2013 Dec 19;5(4):e19. doi: 10.4081/pr.2013.e19;

26) Esposito M, Parisi L, Gallai B, Marotta R, Di Dona A, Lavano SM, Roccella M, Carotenuto M. Attachment styles in children affected by migraine without aura. Neuropsychiatr Dis Treat. 2013; 9: 1513-9. doi: 10.2147/NDT.S52716;

27) Di Filippo T, Orlando MF, Concialdi G, La Grutta S, Lo Baido R, Epifanio MS, Esposito M, Carotenuto M, Parisi L, Roccella M. The quality of life in developing age children with celiac disease. Minerva Pediatr. 2013 Dec; 65(6): 599-608;

28) Maltese A, Pepi A, Scifo L, Roccella M. Referential communication skills in children with Down Syndrome. Minerva Pediatr. 2014 Feb; 66(1): 7-16

29) Esposito M, Marotta R, Roccella M, Gallai B, Parisi L, Lavano SM, Carotenuto M. Pediatric neurofibromatosis 1 and parental stress: a multicenter study. Neuropsychiatr Dis Treat. 2014 Jan 22; 10: 141-6. doi: 10.2147/NDT.S55518;

30) Alesi M, Battaglia G, Roccella M, Testa D, Palma A, Pepi A. Improvement of gross motor and cognitive abilities by an exercise training program: three case reports. Neuropsychiatr Dis Treat. 2014 Mar 14; 10: 479-85. doi: 10.2147/NDT.S58455;

31) Panico A, Messina G, Lupoli GA, Lupoli R, Cacciapuoti M, Moscatelli F, Esposito T, Villano I, Valenzano A, Monda V, Messina A, Precenzano F, Cibelli G, Monda M, Lupoli G. Quality of life in overweight (obese) and normal-weight women with polycystic ovary syndrome. Patient Prefer Adherence. 2017 Mar 2; 11: 423-429;

32) Precenzano F, Ruberto M, Parisi L, Salerno M, Maltese A, Gallai B, Marotta R, Lavano SM, Lavano F, Roccella M. Visual-spatial training efficacy in children affected by migraine without aura: a multicenter study. Neuropsychiatr Dis Treat. 2017 Jan 27; 13: 253-258. doi: 10.2147/NDT.S119648
33) Epifanio, M.F., Genna, V., Di Marco, S., Furnari, M.L., Pardo, F., Collura, M., Roccella, M., La Grutta, S. Quality of life, affect regulation and resilience in adult patients with cystic fibrosis. Gazzetta Medica Italiana Archivio per le Scienze Mediche, 2013 172 (9), pp. 705-711;
34) Parisi L, Di Filippo T, La Grutta S, Lo Baido R, Epifanio MS, Esposito M, Carotenuto M, Roccella M. Sturge-weber syndrome: a report of 14 cases. Ment Illn. 2013 Jun 3; 5(1):e7. doi: 10.4081/mi.2013.e7;
35) Chieffi S, Messina G, Villano I, Messina A, Esposito M, Monda V, Valenzano A, Moscatelli F, Esposito T, Carotenuto M, Viggiano A, Cibelli G, Monda M. Exercise Influence on Hippocampal Function: Possible Involvement of Orexin-A. Front Physiol. 2017 Feb 14; 8: 85. doi: 10.3389/fphys.2017.00085;
36) Villano I, Messina A, Valenzano A, Moscatelli F, Esposito T, Monda V, Esposito M, Precenzano F, Carotenuto M, Viggiano A, Chieffi S, Cibelli G, Monda M, Messina G. Basal Forebrain Cholinergic System and Orexin Neurons: Effects on Attention. Front Behav Neurosci. 2017 Jan 31; 11: 10. doi: 10.3389/fnbeh.2017.00010;
37) Matricardi S, Spalice A, Salpietro V, Di Rosa G, Balistreri MC, Grosso S, Parisi P, Elia M, Striano P, Accorsi P, Cusmai R, Specchio N, Coppola G, Savasta S, Carotenuto M, Tozzi E, Ferrara P, Ruggieri M, Verrotti A. Epilepsy in the setting of full trisomy 18: A multicenter study on 18 affected children with and without structural brain abnormalities. Am J Med Genet C Semin Med Genet. 2016 Sep; 172(3): 288-95. doi: 10.1002/ajmg.c.31513;
38) Messina A, De Fusco C, Monda V, Esposito M, Moscatelli F, Valenzano A, Carotenuto M, Viggiano E, Chieffi S, De Luca V, Cibelli G, Monda M, Messina G. Role of the Orexin System on the Hypothalamus-Pituitary-Thyroid Axis. Front Neural Circuits. 2016 Aug 25; 10: 66. doi: 10.3389/fncir.2016.00066;
39) Moscatelli F, Valenzano A, Petito A, Triggiani AI, Ciliberti MAP, Luongo L, Carotenuto M, Esposito M, Messina A, Monda V, Monda M, Capranica L, Messina G, Cibelli G. Relationship between blood lactate and cortical excitability between taekwondo athletes and non-athletes after hand-grip exercise. Somatosens Mot Res. 2016 Jun; 33(2): 137-44. doi: 10.1080/08990220.2016.1203305;
40) Carotenuto M, Esposito M, Cortese S, Laino D, Verrotti A. Children with developmental dyslexia showed greater sleep disturbances than controls, including problems initiating and maintaining sleep. Acta Paediatr. 2016 Sep; 105(9): 1079-82. doi: 10.1111/apa.13472;
41) Pasquali D, Carotenuto M, Leporati P, Esposito M, Antinolfi L, Esposito D, Accardo G, Carella C, Chiovato L, Rotondi M. Maternal hypothyroidism and subsequent neuropsychological outcome of the progeny: a family portrait. Endocrine. 2015 Dec; 50(3): 797-801. doi: 10.1007/s12020-015-0564-3;
42) Morandi A, Bonnefond A, Lobbens S, Carotenuto M, Del Giudice EM, Froguel P, Maffeis C. A girl with incomplete Prader-Willi syndrome and negative MS-PCR, found to have mosaic maternal UPD-15 at SNP array. Am J Med Genet A. 2015 Nov; 167A(11): 2720-6. doi: 10.1002/ajmg.a.37222;
43) Verrotti A, Carotenuto M, Altieri L, Parisi P, Tozzi E, Belcastro V, Esposito M, Guastaferro N, Ciuti A, Mohn A, Chiarelli F, Agostinelli S. Migraine and obesity: metabolic parameters and response to a weight loss programme. Pediatr Obes. 2015 Jun; 10(3): 220-5. doi: 10.1111/ijpo.245;
44) Esposito M, Precenzano F, Sorrentino M, Avolio D, Carotenuto M. A Medical Food Formulation of Griffonia simplicifolia/Magnesium for Childhood Periodic Syndrome Therapy: An Open-Label Study on Motion Sickness. J Med Food. 2015 Aug; 18(8): 916-20. doi: 10.1089/jmf.2014.0113;
45) Franzoni E, Matricardi S, Di Pisa V, Capovilla G, Romeo A, Tozzi E, Pruna D,Salerno GG, Zamponi N, Accorsi P, Giordano L, Coppola G, Cerminara C, Curatolo P, Nicita F, Spalice A, Grosso S, Pavone P, Striano P, Parisi P, Boni A, Gobbi G, Carotenuto M, Esposito M, Cottone C, Verrotti A. Refractory absence seizures: An Italian multicenter retrospective study. Eur J Paediatr Neurol. 2015 Nov; 19(6): 660-4. doi: 10.1016/j.ejpn.2015.07.008;
46) Esposito M, Gallai B, Roccella M, Marotta R, Lavano F, Lavano SM, Mazzotta G, Bove D, Sorrentino M, Precenzano F, Carotenuto M. Anxiety and depression levels in prepubertal obese children: a case-control study. Neuropsychiatr Dis Treat. 2014 Oct 3; 10: 1897-902. doi: 10.2147/NDT.S69795;
47. Carotenuto M, Esposito M, Pascotto A. Facial patterns and primary nocturnal enuresis in children. Sleep Breath. 2011 May; 15(2): 221-7. doi: 10.1007/s11325-010-0388-6;
48. Esposito M, Gallai B, Parisi L, Roccella M, Marotta R, Lavano SM, Mazzotta G, Carotenuto M. Primary nocturnal enuresis as a risk factor for sleep disorders: an observational questionnaire-based multicenter study. Neuropsychiatr Dis Treat. 2013; 9: 437-43. doi: 10.2147/NDT.S43673;
49. Santamaria F, Esposito M, Montella S, Cantone E, Mollica C, De Stefano S, Mirra V, Carotenuto M. Sleep disordered breathing and airway disease in primary ciliary dyskinesia. Respirology. 2014 May; 19(4): 570-5. doi: 10.1111/resp.12273;
50. Carotenuto M, Esposito M, D'Aniello A, Rippa CD, Precenzano F, Pascotto A, Bravaccio C, Elia M. Polysomnographic findings in Rett syndrome: a case-control study. Sleep Breath. 2013 Mar; 17(1): 93-8. doi: 10.1007/s11325-012-0654-x

Corresponding author
MICHELE ROCCELLA; MD; PhD
Department of Psychological,
Pedagogical and Educational Sciences
University of Palermo
(Italy)