

# Depression, anxiety and daytime sleepiness of primary caregivers of children with cerebral palsy

*Depressão, ansiedade e sonolência diurna em cuidadores primários de crianças com paralisia cerebral*

*Depresión, ansiedad y somnolencia diurna en cuidadores primarios de niños con parálisis cerebral*

Catherine Marx<sup>1</sup>, Erica Masruha Rodrigues<sup>2</sup>, Marcelo Masruha Rodrigues<sup>3</sup>, Luiz Celso P. Vilanova<sup>4</sup>

## ABSTRACT

**Objective:** To evaluate depression, anxiety and excessive daytime sleepiness (EDS) levels in primary caregivers of children with cerebral palsy (CCP) and to trace the relationships with their socioeconomic conditions and child neurological characteristics, as compared with caregivers of typical children (CTC).

**Methods:** 45 CCP and 50 CTC were randomly chosen and answered a semi-structured questionnaire. We evaluated EDS on the Epworth scale. Beck depression inventory (BDI) and the state-trait anxiety inventory (STAI) identified depressive and anxious symptoms, respectively.

**Results:** The majority of subjects were mothers with low socioeconomic level. Self-perception of anxiety and depressive symptoms of CCP were confirmed through BDI and STAI. EDS was statistically related to high levels of depression. Children's disabilities did not influence the results.

**Conclusions:** Depression, anxiety symptoms and sleep disruption were common in CCP. Child functional level did not influence the results.

**Key-words:** cerebral palsy; caregivers; depression; anxiety; somnolence.

## RESUMO

**Objetivo:** Avaliar os níveis de depressão, ansiedade e sonolência diurna excessiva em cuidadores primários de crianças com paralisia cerebral, relacionando-os às condições socioeco-

nômicas do cuidador e às características neurológicas da criança e comparando-os a cuidadores de crianças saudáveis.

**Métodos:** 45 cuidadores de crianças com paralisia cerebral e 50 cuidadores de crianças saudáveis foram aleatoriamente incluídos no estudo e responderam a um questionário semiestruturado. Avaliaram-se os níveis de depressão, ansiedade e sonolência diurna excessiva por meio das escalas de Beck, ansiedade estado-traço e Epworth, respectivamente.

**Resultados:** A maioria dos entrevistados eram mães com baixo nível socioeconômico. Os que se autoavaliaram como ansiosos e depressivos apresentaram resultados comprobatórios de ansiedade e depressão com as escalas de ansiedade estado-traço e Beck para os cuidadores de crianças com paralisia cerebral. Os níveis de sonolência diurna excessiva estiveram relacionados a elevados níveis de depressão. O comprometimento neurológico das crianças não influenciou os resultados sobre os cuidadores.

**Conclusões:** Depressão, ansiedade e problemas relacionados ao sono foram comuns em cuidadores de crianças com paralisia cerebral. O nível de funcionalidade neurológica da criança não influenciou os resultados.

**Palavras-chave:** paralisia cerebral; cuidadores; depressão; ansiedade; sonolência.

## RESUMEN

**Objetivo:** Evaluar los niveles de depresión, ansiedad y somnolencia diurna excesiva en cuidadores primarios de niños con parálisis cerebral relacionándolos a las condiciones socioeco-

Instituição: Departamento de Neurologia e Neurocirurgia da Universidade Federal de São Paulo (Unifesp), São Paulo, SP, Brasil

<sup>1</sup>Mestre em Neurologia Infantil pela Unifesp; Médica Assistente da Neurologia Infantil do Departamento de Neurologia e Neurocirurgia da Unifesp, São Paulo, SP, Brasil

<sup>2</sup>Mestre em Ciências pela Unifesp; Psicóloga do Departamento de Neurologia e Neurocirurgia da Unifesp, São Paulo, SP, Brasil

<sup>3</sup>Doutor em Neurologia Infantil pela Unifesp; Professor Adjunto da Disciplina de Neurologia Clínica do Departamento de Neurologia e Neurocirurgia da Unifesp, São Paulo, SP, Brasil

<sup>4</sup>Doutor em Neurologia Infantil pela Unifesp; Professor Associado da Disciplina de Neurologia Clínica do Departamento de Neurologia e Neurocirurgia da Unifesp, São Paulo, SP, Brasil

Endereço para correspondência:

Catherine Marx  
Rua Botucatu, 720  
CEP 04023-900 – São Paulo/SP  
E-mail: marxcatherine@hotmail.com

Fonte financiadora: Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP). Processo regular FAPESP: 2009/52145-7

Conflito de interesse: nada a declarar

Recebido em: 4/12/2010

Aprovado em: 13/6/2011

nómicas del cuidador y a las características neurológicas del niño y comparándolos a cuidadores de niños sanos.

**Métodos:** Se incluyeron aleatoriamente en el estudio a 45 cuidadores de niños con parálisis cerebral y a 50 cuidadores de niños sanos, y contestaron a un cuestionario semiestructurado. Se evaluaron los niveles de depresión, ansiedad y somnolencia diurna excesiva mediante las escalas de Beck, ansiedad estado-rasgo y Epworth, respectivamente.

**Resultados:** La mayoría de los entrevistados eran madres con bajo nivel socioeconómico. Los que se autoevaluaron ansiosos y depresivos presentaron resultados comprobatorios de ansiedad y depresión con los inventarios de estado-rasgo y Beck para los cuidadores de niños con parálisis cerebral. Los niveles de somnolencia diurna excesiva estuvieron estadísticamente relacionados a los elevados niveles de depresión. El comprometimiento neurológico de los niños no influyó los resultados sobre los cuidadores.

**Conclusiones:** Depresión, ansiedad y problemas relacionados al sueño son comunes en cuidadores de niños con parálisis cerebral. El nivel de funcionalidad neurológica del niño no influencia los resultados.

**Palabras clave:** parálisis cerebral; cuidadores; depresión; ansiedad; somnolencia.

## Introduction

Cerebral Palsy (CP) is one of the most common neurological impairments in children worldwide, and is especially prevalent in developing countries with poor medical and labor assistance<sup>(1)</sup>.

The last definition of CP published in 2007 describes it as a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of CP are often accompanied by disturbances of sensation, perception, cognition, communication, and behavior, by epilepsy, and by secondary musculoskeletal problems<sup>(2-4)</sup>.

There is no cure for this condition, but therapy, education and technology can maximize each child's potential by improving functional abilities and quality of life<sup>(5)</sup>. Children's general improvement seems to be directly related to caregiver dedication and concern<sup>(6)</sup>. Psychological and physical impairments are common disorders among those who care of children with chronic medical conditions<sup>(7-9)</sup>.

Depression and anxiety are frequent psychiatric disorders in general population, but seems to be more prevalent among caregivers of people with chronic diseases. Recently

described by Tyrer *et al*<sup>(10)</sup> as a single disease due to their frequent association they are usually related to sleep disorders and daytime sleepiness<sup>(11-13)</sup>. On the other hand, children with CP often suffer of sleep disturbances, which affect their caregivers' quality of sleep as well<sup>(14-16)</sup>.

The purpose of this research is to evaluate depression, anxiety and excessive daytime sleepiness (EDS) levels in primary caregivers of children with cerebral palsy. Are they more common than in general population? Do children's disabilities or caregivers' socioeconomic conditions influence the results?

## Method

This cross-sectional study involved 45 caregivers of children with cerebral palsy and 50 caregivers of typical children whose children were aged six months to 12 years (there was no child under six months of age in our sample and usually children above 12 years of age are no longer followed at pediatric neurology clinic at Universidade Federal de São Paulo- UNIFESP). To carry out the interviews, a semi-structured guide was used.

Caregivers were considered those who were actually responsible for the child's life decisions, irrespective of sex or relationship. Caregivers answered personal questions concerning time spent with the child and self-perceptions regarding depressive and anxiety symptoms with an objective question: "Do you consider yourself depressed or anxious?". Excessive daytime sleepiness was evaluated with Epworth scale support. A validated scale composed of eight simple questions about regular daytime activities graduating them in different levels according to the chance of sleeping while performing those activities<sup>(17,18)</sup>. In order to diagnose depression, Beck Depression Inventory (BDI)<sup>(19)</sup> was used, and the anxiety symptoms were identified through the State-Trait Anxiety Inventory (STAI). Trait anxiety inventory (STAI-T) defined as relatively stable personal attribute to respond to stressful situations and state anxiety inventory (STAI-S) as a transitory state of anxiety when facing a stressful condition<sup>(20)</sup>.

We observed and also asked caregivers of children with CP about the function level of their children and classified them into five groups according to the gross motor function classification system (GMFCS)<sup>(21)</sup>. Information was also obtained regarding any ongoing rehabilitation, drug intake or devices used.

Caregivers of children with diagnosis of CP were randomly chosen at the pediatric neurology clinic at UNIFESP. We personally invited them during their child's regular appointment. If they missed the appointment they were

invited by phone to come to the hospital and be interviewed. Fifty parents were contacted in four months. Two of them could not come because their children were recovering from surgery, one did not speak Portuguese, and other two did not want to participate into the research. Fifty-two caregivers of typical children were randomly chosen from general population (workers from the hospital, people who attended stores nearby and people on the streets were invited to participate in the study). All of them, except two, accepted the invitation. We previously asked them if they were caregivers of a child to enter the study. We tried to invite people that apparently had the same socio-economical and educational level in order to match both groups (CTC and CCP).

This study was approved by ethics committee (*Comitê de Ética em Pesquisa* from UNIFESP) and was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. Informed consent was obtained from all subjects prior to their inclusion in the study.

Primary analysis, i.e., prevalence of depression, anxiety and EDS in CCP and in CTC was assessed using BDI, STAI and the Epworth scale, respectively. Secondary analyses involved a determination of which family factors, socio-economic issues, demographic aspects and child characteristics correlated with depression, anxiety and Excessive Daytime Sleepiness levels in each group. We correlated demographic characteristics of CCP and CTC; we obtained the results of every inventory (BDI, STAIT, Epworth) for each group of parents and then compared the results between groups. The functional level of each child (GMFCS) was correlated with the results of depression, anxiety and somnolence levels of the caregivers of children with cerebral palsy group.

Chi-square test (X<sup>2</sup>) (without Yates' correction) was used to compare nominal categorical data. Continuous data were compared using student's *t* test for independent variables and dependent variables with two variables. In cases with two variables with nonparametric distribution, the Kruskal Wallis test was employed. Spearman's correlation coefficient (*r*) was calculated to evaluate continuous samples, as well as point-biserial correlation coefficient (*rpb*) when a dichotomous variable was involved. Multiple linear regressions were used to investigate the relationship between independent and dependent variables. Results were calculated with the Wald test (Wald X<sup>2</sup>). Assumptions of these analyses were verified using coefficient of variation (R<sup>2</sup>). Missing data were excluded. Probability (*p*) under 0.05 was considered to indicate statistical significance. All tests were two-tailed. Confidence intervals (CI) of 95% were calculated related to

average differences. Analyses were carried out with SPSS (Statistical Package for the Social Science) 11.5.2.1 software for Windows.

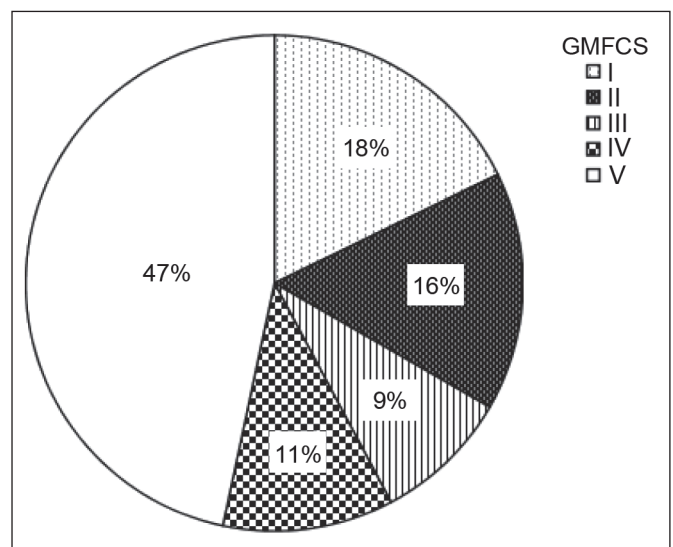
## Results

One-hundred and two caregivers were recruited and 95 were actually included; 45 (47%) were CCP and 50 (53%) CTC. Most part of those children included in CCP group was classified as severely impaired according to GMFCS (Figure 1).

All demographic data, except age, were different between groups. Income of CCP was significantly lower than CTC. CCP spent more time with their children, had lower educational levels, worked just a few hours outside of their home, and had less stable relationship (Table 1).

Psychological evaluation revealed that CCP had more symptoms of depression and anxiety, and had significantly more EDS compared to CTC. STAIT-S results did not differ between groups (Table 2).

Self-perception of anxiety was lower in CTC, regardless of no objective difference between STAI-T and STAI-S inventories scores CTC and CPC groups. However, in both groups, those who referred themselves as anxious presented higher IDATE-T scores compared to those that did not considered themselves as an anxious person. Both groups equally stated symptoms of depression. Comparing mean scores on Beck scale to self perception of depressive mood we noticed that



**Figure 1** - Frequency of children with cerebral palsy classified according to the GMFCS. The majority (47%) were class V, followed by classes I, II, IV and III.

**Table 1** - Descriptive demographic data analysis of the caregiving groups accordingly to the group of study.

	CCP (n=50)	CTC (n=45)
Age		
x±dp	32.5±6.4	34.9±9.4
med (variation)	32 (22-54)	32 (20-64)
Family income (mw)		
x±dp	5.3±5.5	1.9±0.9
med (variation)	4 (1-30)	2 (1-4)
Time spent with child (h/w)		
x±dp	5.8±5.2	18.4±7.4
med (variation)	4 (0-24)	24 (3-24)
Education		
n (%) low	12 (24%)	26 (58%)
WWH		
n (%) <20 hours	6 (12%)	35 (78%)
Relationship		
n (%) Stable	40 (80%)	25 (56%)

SD: standard deviation; mw: minimum wage (around US\$240); h/w: hours per week; WWH: work week hours; low education level: <8 years and high is above 8 years of study

**Table 2** – Caregivers’ descriptive analysis of the psychological evaluations and daily somnolence

	Mean	SD	Median	Minimum	Maximum
<b>CCP</b>					
Beck	7.5	5.0	7	0	23
STAI-T	40.0	8.7	39	26	59
STAI-S	40.7	9.5	39	23	61
Epworth	8.5	4.8	9	0	21
<b>CTC</b>					
Beck	12.5	8.8	13	0	37
STAI-T	45.6	11.1	45	26	71
STAI-S	43.0	10.9	40	20	64
Epworth	85.7	16.7	90	45	100

SD: standard deviation; Beck and STAI results represent final score of the applied scale and Epworth scale results represent the total percentage chance of falling sleep during activities listed.

scores of the CTC group had no significant difference to self perception of depressive mood (Table 3).

Multiple linear regressions were used in order to explore the relationship between CTC and depression, using scores obtained from BDI as dependent variables, and those that differed between groups as independent variables (school grade, family income, marriage status, time spent with the

child, working time, and Epworth scale) and the CTC itself. Stepwise forward likelihood ratio was applied to include independent variables.

The two strongest influences on having depressive symptoms were the fact of being a CCP itself and the Epworth scores. Excessive Daytime Sleepiness was also strongly correlated to depression, even in the CTC group.

The same test was used to evaluate anxiety levels, and again the fact of being a CCP and the Epworth scales, combined with EDS, proved to show the strongest associations.

Table 4 depicts sleep analyses of both groups. Excessive Daytime Sleepiness, CCP, STAIT-T results and hours of sleep influenced Epworth scale scores.

Finally, this study did not find an influence of the child’s impairment on levels of depression, anxiety and EDS, although almost half of them were classified as GMFCS grade V (Figure 1). Children presented on average two comorbidities (epilepsy, mental impairment, visual and/or hearing deficits) and two rehabilitation practices (physiotherapy, horseback riding therapy, hydrotherapy, occupational therapy and/or speech therapy). None of these factors was sufficient to influence depression, anxiety or EDS levels in CCP.

## Discussion

The predominance of women in caregiving has been extensively discussed in previous studies<sup>(22)</sup>, and it was again notable here. Single mothers predominantly undertook the primary caregiving for CP children.

Education, work week hours and family income were lower in CCP group. Some authors have offered similar descriptions<sup>(7,8)</sup>. There is an increased financial burden in providing care for a child with a disability, and some of this may be attributable to diminished ability to work or to work full-time<sup>(7)</sup>. Caring for these children requires constant attention and there is not enough time to work and take care of them. This is especially true among those who do not receive adequate family or social support<sup>(23,24)</sup>. Moreover, low income people usually lack a good medical assistance especially during pregnancy and labor, and they have greater chances of having a child with CP<sup>(25)</sup>.

In contrast with previous studies, we found a higher rate of unstable relationships in the CCP group<sup>(26,27)</sup>. Vieira *et al* analyzed everyday activities of mothers of children with CP in Brazil<sup>(24)</sup>. They found that a disrupted father-mother-child relationship compromised marital status. The effects were attributed to lack of therapeutic,

**Table 3** - Comparison of anxiety and depression inventory scores accordingly to subjective perception of anxiety and depression using student's T test for independent samples stratified by group.

Psychological evaluation	Subjective perception				95%CI (mean)	p
	mean (sd)					
	Present	Absent				
<b>CCP</b>						
STAI-T	36.29	7.31	42.66	8.80	-11.10 to -1.64	0.009
BECK	7.41	5.21	8.00	4.36	-4.34 to 3.17	0.756
<b>CTC</b>						
STAIT-T	39.00	10.43	47.51	10.66	-16.19 to -0.84	0.030
BECK	10.89	8.71	19.75	4.56	-15.29 to -2.42	0.008

CI: confidence interval; DF: degrees of freedom; p: probability

family and social support, and to mothers overburdened with responsibilities. We did not investigate the cause of their relationships disruption, but many of them were not legally married.

Caregivers of people with chronic disease have been described as having sleep disruptions. They have more trouble falling asleep, have frequent spontaneous or provoked arousals and Excessive Daytime Sleepiness<sup>(14)</sup>. Previous studies of Gallagher *et al.* reported that poor sleep quality and high burden were associated with higher levels of both depression and anxiety<sup>(26)</sup>. According to Diagnostic and Statistical Manual of Mental Disorders (DSM IV) sleep impairment is part of the diagnostic criterion for depression and anxiety disorders *per se* and, on the other hand, sleep trouble is a risk factor for depressive and anxious symptoms, and these have been known to lead into insomnia<sup>(11,12)</sup>.

This study, quite the opposite, found high Epworth scores on both groups that were not related to high scores in depression and anxiety inventories. The relationship between EDS and depression or anxiety symptoms was not established. Caregivers of children with CP referred themselves as bad sleepers, but we did not investigate the quality of sleep of their children to see if it influenced their caregiver's quality of sleep as well.

Regardless of including children with severe impairment, their functional independence was unrelated to any aspect of caregiver depression, anxiety or EDS. This finding is consistent with previous results reported by Manuel *et al* and Hamzat *et al*<sup>(28,29)</sup>. The former author attributed this to statistical bias because the great majority of studies consider child functional impairment to be an important contributor to mental and physical distress

**Table 4** - Descriptive analysis related to caregiver's sleep data stratified by group.

	CCP (n=50)	CTC (n=45)
Latency (h)		
x±dp	0.2±0.5	0.6±0.8
med (variation)	0 (0-2)	0 (0-4)
Sleep (h/n)		
x±dp	6.6±1.4	7.4±1.6
med (variation)	7 (3-10)	8 (4-10)
Arousals (a/s)		
x±dp	0.6±0.7	0.8±0.9
med (variation)	0 (0-2)	1 (0-2)
Daytime somnolence		
n (%) yes	32 (64%)	35 (78%)

Latency: period of time in hour (h) spent until getting into sleep; Sleep (h/n): total number of slept hours per night; Arousals (a/s): total number of times a person wakes up during sleep period.

among caregivers<sup>(7,8,23,24,27,30)</sup>. We should mention that the GMFCS is quite a new form of classification and child behavior was not considered in this study, something that mostly influenced previous results in caregivers levels of psychiatric illness<sup>(30)</sup>.

Depression and anxiety symptoms have been found to be more prevalent among caregivers of children with CP. Children's functional impairment had no influence whatsoever on these results. All CCP that visit a child neurology clinic should be directed to a group of support consisted by psychologists, social workers, psychiatrist and other caregivers to share their experience and hints to deal with the child, independent of the child impairment level. We should particularly care for CCP with low grade GMFCS of CP that

are often forgotten because we are apt to consider them as healthy children compared to those ones severely impaired with so many other issues to take care of.

We could highlight the great difference of EDS levels scores between CCP and CTC, which was not attributed to depression and anxiety disorders, as would be expected.

Socio-economic factors did not differ from those seen in previous studies. Most of the caregivers were women, with poor socio-economic conditions aggravated by unemployment and privation of social support. This study also found that unstable marital status is more common among caregivers of children with CP.

## References

1. Pato TR, Pato TR, Souza DR, Leite HP. Cerebral palsy epidemiology. *Acta Fisiatr* 2002;9:71-6.
2. Armstrong RW. Definition and classification of cerebral palsy. *Dev Med Child Neurol* 2007;49:166.
3. Morris C. Definition and classification of cerebral palsy: a historical perspective. *Dev Med Child Neurol Suppl* 2007;109:3-7.
4. Rosenbloom L. Definition and classification of cerebral palsy. Definition, classification, and the clinician. *Dev Med Child Neurol Suppl* 2007;109:43.
5. Jones MW, Morgan E, Shelton JE, Thorogood C. Cerebral palsy: introduction and diagnosis (part I). *J Pediatr Health Care* 2007;21:146-52.
6. Sipal RF, Schuengel C, Voorman JM, Van Eck M, Becher JG. Course of behaviour problems of children with cerebral palsy: the role of parental stress and support. *Child Care Health Dev* 2010;36:74-84.
7. Brehaut JC, Kohen DE, Raina P, Walter SD, Russell DJ, Swinton M *et al*. The health of primary caregivers of children with cerebral palsy: how does it compare with that of other Canadian caregivers? *Pediatrics* 2004;114:e182-91.
8. Raina P, O'Donnell M, Rosenbaum P, Brehaut J, Walter SD, Russell D *et al*. The health and well-being of caregivers of children with cerebral palsy. *Pediatrics* 2005;115:e626-36.
9. Wallander JL, Pitt LC, Mellins CA. Child functional independence and maternal psychosocial stress as risk factors threatening adaptation in mothers of physically or sensorially handicapped children. *J Consult Clin Psychol* 1990;58:818-24.
10. Tyrer P. The case for cothymia: mixed anxiety and depression as a single diagnosis. *Br J Psychiatry* 2001;179:191-3.
11. Taylor DJ, Lichstein KL, Durrence HH, Reidel BW, Bush AJ. Epidemiology of insomnia, depression, and anxiety. *Sleep* 2005;28:1457-64.
12. Lépine JP. Epidemiology, burden, and disability in depression and anxiety. *J Clin Psychiatry* 2001;62 (Suppl 13):4-10.
13. Buysse DJ, Angst J, Gamma A, Ajdacic V, Eich D, Rössler W. Prevalence, course, and comorbidity of insomnia and depression in young adults. *Sleep* 2008;31:473-80.
14. Hemmingsson H, Stenhammar AM, Paulsson K. Sleep problems and the need for parental night-time attention in children with physical disabilities. *Child Care Health Dev* 2009;35:89-95.
15. Meltzer LJ, Mindell JA. Impact of a child's chronic illness on maternal sleep and daytime functioning. *Arch Intern Med* 2006;166:1749-55.
16. Wright M, Tancredi A, Yundt B, Larin HM. Sleep issues in children with physical disabilities and their families. *Phys Occup Ther Pediatr* 2006;26:55-72.
17. Johns MW. A new method for measuring daytime sleepiness: the Epworth sleepiness scale. *Sleep* 1991;14:540-5.
18. Bertolazi AN, Fagundes SC, Hoff LS, Pedro VD, Menna Barreto SS, Johns MW. Portuguese-language version of the Epworth sleepiness scale: validation for use in Brazil. *J Bras Pneumol* 2009;35:877-83.
19. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry* 1961;4:561-71.
20. Bieling PJ, Antony MM, Swinson RP. The State-Trait Anxiety Inventory, Trait version: structure and content re-examined. *Behav Res Ther* 1998;36:777-88.
21. Palisano RJ, Hanna SE, Rosenbaum PL, Russell DJ, Walter SD, Wood EP *et al*. Validation of a model of gross motor function for children with cerebral palsy. *Phys Ther* 2000;80:974-85.
22. Tarimo EA, Kohi TW, Outwater A, Blystad A. Gender roles and informal care for patients with AIDS: a qualitative study from an urban area in Tanzania. *J Transcult Nurs* 2009;20:61-8.
23. King GA, King SM, Rosenbaum PL. How mothers and fathers view professional caregiving for children with disabilities. *Dev Med Child Neurol* 1996;38:397-407.
24. Vieira NG, Mendes NC, Frota LM, Frota MA. The daily routine of mothers with children bearers of cerebral palsy. *RBPS* 2008;21:55-60.
25. Hjern A, Thorngren-Jerneck K. Perinatal complications and socio-economic differences in cerebral palsy in Sweden - a national cohort study. *BMC Pediatr* 2008;8:49.
26. Gallagher S, Phillips AC, Oliver C, Carroll D. Predictors of psychological morbidity in parents of children with intellectual disabilities. *J Pediatr Psychol* 2008;33:1129-36.
27. Monteiro M, Matos AP, Coelho R. Adaptação psicológica de mães cujos filhos apresentam paralisia cerebral - resultados de um estudo. *Rev Port Psicossomática* 2004;6:115-30.
28. Manuel J, Naughton MJ, Balkrishnan R, Paterson Smith B, Koman LA. Stress and adaptation in mothers of children with cerebral palsy. *J Pediatr Psychol* 2003;28:197-201.
29. Hamzat TK, Mordi EL. Impact of caring for children with cerebral palsy on the general health of their caregivers in an African community. *Int J Rehabil Res* 2007;30:191-4.
30. Canning RD, Harris ES, Kelleher KJ. Factors predicting distress among caregivers to children with chronic medical conditions. *J Pediatr Psychol* 1996;21:735-49.