

# The Assessment of Sleep in Pediatric Chronic Pain Sufferers

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## INTRODUCTION

Sleep is one of the most essential physiological needs. Good sleep is fundamental for adequate rest, ensuring proper functioning, and preserving an individual's health. Sleep appears often altered or deteriorated in children and adolescents with health problems, notably in chronic medical conditions. Sleep is regarded as a crucial issue when dealing with chronic pain patients, and of critical interest in the case of children and adolescents. (1) The aim of this work was to (a) review available subjective (questionnaires) and two objective measures (polysomnography and actigraphy) for the assessment of sleep in pediatric chronic pain sufferers.

## METHOD

First, PsycINFO, ERIC, FRANCIS, MEDLINE, PsycARTICLES, Global health, Inspec, Health and Psychosocial Instruments, CINAHL and Scopus were all electronically searched from inception to June 2011 of these databases. Second, reference lists of relevant retrieved papers were checked to identify additional published works not found in the electronic searches. An article was eligible if it met all of the following criteria: (1) had to be published in a peer reviewed journal; (2) age of participants had to be 18 or below; (3) the study population had to be suffering pain; (4) the article was a full report published in English or Spanish; and (5) assessed sleep using subjective and or objective sleep measures. An article was excluded if it: (1) did not assess sleep quality (for example, it was centered on sleepiness or circadian rhythms); and (2) dealt with cancer or chemotherapy-related pain.

## REFERENCES

- 1.- McGrath, P. J., Walco, G. A., Turk, D. C., Dworkin, R. H., Brown, M. T., Davidson, K., Eccleston, C., Finley, G. A., Goldschneider, K., Haverkos, L., Hertz, S. H., Ljungman, G., Palermo, T., Rappaport, B. A., Rhodes, T., Schechter, N., Scott, J., Sethna, N., Svensson, O. K., Stinson, J., Von Baeyer, C. L., Walker, L., Weisman, S., White, R. E., Zajicek, A. y Zeltzer, L. (2008). Core outcome domains and measures for pediatric acute and chronic/recurrent pain clinical trials: PedImpact Recommendations. *The Journal of Pain*, 9(9), 771-783.
- 2 -Cohen, L. L., La Greca, A. M., Blount, R. L., Kazak, A. E., Holmbeck, G. N., y Lemaneck, K. L. (2008). Introduction to special issue: Evidence-based assessment in pediatric psychology. *Journal of Pediatric Psychology*, 33(9), 911–915.
- 3.- Spruyt, K. y Gozal, D. (2010). Pediatric sleep questionnaires as diagnostic or epidemiological tools: a review of currently available instrument. *Sleep Medicine Reviews*, 15(1), 19-32.

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## RESULTS

### Questionnaires

2 questionnaires were found that can be considered “well-established” and 3 that are “approaching” on the basis of the EBA criteria (2). The questionnaires rated as “well-established” for its use with pediatric pain samples are the “Children Sleep Habits Questionnaire” that has been used in 6 pain-related studies, and the “Adolescent Sleep Wake Scale” that has been used in 3 pain-related investigations (see Table 1).

### Polysomnography

Polysomnography is considered “the gold standard” to assess sleep but it has been used in only 7 studies. It assesses biophysiological variables, like brain function, heart rate, eye movement and muscle activation, while the subject is sleeping, and provides information on parameters like the total sleep time, sleep disordered breathing, sleep stages, and their distribution. In most studies, participants' samples were small, mostly used with very young patients. Most of the studies reported as little as 2 nights of registers: a night of sleep laboratory habituation and a night of evaluation. Juvenile arthritis is the pain problem in which polysomnography has been used the most, what is evidence of reliability and validity or predictive value.

### Actigraphy

7 studies have used actigraphy to assess sleep quality in pediatric pain studies. As it is the case with polysomnography, participating samples were composed, in most of the studies, by a clinical group with an age and sex matched control group. Sample size ranged between 19 and 169 subjects. The age of the participants was between 6 and 16 years. Most of the studies reported one week of measurements.

Table 1

Name	Author and year	Number of items	Language	Age and respondent	Psychometric properties	Pain population	Psychometric properties when used in pain
Adolescent Sleep Wake Scale ASWS	LeBourgeois, M.K. et al. (2005)	28	English Italian	12 – 17 years (Self administrated)	Internal consistency (α = .80-.86)	Chronic pain	Not assessed
						Chronic pain	Internal consistency (α = .70)
						Chronic pain	Internal consistency (α = .70)
Children's Sleep Habits Questionnaire (school ages) CSHQ	Owens, J.A., et al. (2000)	56	English	4 – 10 years	Internal consistency (α = .68-.78) Test-retest reliability (Pearson .40-.79)	Juv. Rheumatic Arthritis	Reliability (α .86)
						Migraine	Correlation with SSR
						Juv. Idiopathic Arthritis	Not assessed
Preschool and toddlers version	Goodlin-Jones, B.L., et al. (2008)	33	English	2 - 5 ½ years	Correlations with diaries and actigraphy	Juv. Idiopathic Arthritis	Not assessed
						Injuries	Not assessed
Dutch version	Waumans, R.C. et al. (2010)	33	Dutch	6 – 12 years (Parent)	Test-retest reliability (Pearson 0.47-0.93)	Sickle cell disease	Consistent with original study

## CONCLUSIONS

Sleep can influence chronic pain, and chronic pain may, in turn, negatively impact on sleep quality. Therefore, a proper assessment of sleep in chronic pain sufferers is of critical importance. Sleep is also one of the outcome domains that have been recommended to be used in clinical trials of pediatric chronic pain by PedIMPACT group (2). There are many questionnaires that have been used to assess sleep in pediatric chronic pain sufferers, however, only two can be considered as well established on the basis of the EBA criteria (1). More objective assessment devices, like polysomnography and actigraphy, have reliably been used in the assessment of chronic pediatric pain sufferers, although these objectives procedures are less common because of costs.

An adequate analysis of sleep in chronic pediatric populations requires a multimethod assessment approach. Information provided by subjective measures (i.e., questionnaires) should be complemented with information provided by more objective available alternatives (i.e., actigraphy, polisomnography) in order to improve the reliability and validity of our measurements.