Sleep quality perception in youth population

Percepción de calidad de sueño en jóvenes

Percepção da qualidade do sono em jovens

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Abstract

Objective: to assess sleep habits and sleep quality perception in a Colombian and Mexican youth sample. *Materials and methods:* following a sleep diary methodology with a questionnaire of 27 categorical and quantitative items, the assessment was done immediately upon awakening. *Results:* it was applied to 317 high school (n= 189) and undergrads (n= 128) in Bogotá, Colombia (n= 197) and México City, México (n= 120); 147 females (46,4%) and 170 males (53,6%). The mean age was 18,6 ± 2,81 years with a median and mode of 17 years. The Cronbach's alpha obtained from 135 measurements during the study period was 0,86 and 0,57 from the mean values of 27 scale items. An inverse correlation was found between hours of sleep per night and number of naps (r= -0,12; p= 0,029); 38% of participants did not nap and slept on average 7,6 night hours or more ($X2$= 2,78; p= 0,047). The men took more naps than women (men 76,5%; women 55,6%; $X2$= 15,26; p= 0,000). A reduction of hours of sleep per night and the need for naps was significantly associated with participants' gender. The mean and median hours of sleep per night (7,2 hours) was used to classify the population into two groups: sleep (+) 7,3 or more hours and sleep (-) 7,2 hours or less. These groups were compared. *Conclusions:* youth population evaluated showed a reduction of hours of sleep per night. This was associated to naps frequency and participant gender.

Keywords: *youth, sleep diaries, sleep quality perception, screening, Colombia, México.*

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Resumen

Objetivos: evaluar los hábitos y la percepción de la calidad de sueño en una muestra de jóvenes colombianos y mexicanos. *Materiales y métodos*: utilizando la metodología de diario de sueño se evalúa inmediatamente al despertar la calidad de sueño percibida con un cuestionario constituido por 27 reactivos categóricos y cuantitativos. *Resultados:* se evaluaron 317 estudiantes de bachillerato/preparatoria (n= 189) y de primeros semestres universitarios (n= 128) en Bogotá (n= 197) y en Ciudad de México (n= 120). De ellos, 147 fueron mujeres (46,4%) y 170 fueron hombres (53,6%). El promedio de edad fue 18,6 ± 28,1 años, con una mediana y una moda de 17 años. El alfa de Cronbach obtenido de 135 mediciones en el período de estudio fue 0,86 y 0,57 con los valores promedio de 27 reactivos. Hubo una correlación inversa entre las horas de sueño nocturno y las siestas (r= -0,12; p= 0,029). Un 38% de los participantes no hizo siestas y durmió en promedio 7,6 horas nocturnas o más (X^2= 2,78; p= 0,047). Los hombres hicieron más siestas con un 76,5%, frente a un 55,6% de las mujeres; X^2= 15,26; p= 0,000). Una reducción de las horas de sueño nocturno y la necesidad de tomar siestas estuvo significativamente asociada con el género de los participantes. El promedio y la mediana de horas de sueño nocturno (7,2 horas) se usó para clasificar la población en grupo de sueño (+) con 7,3 o más y grupo de sueño (-) con 7,2 o menos. Estos grupos fueron comparados. *Conclusión:* la población juvenil evaluada mostró una reducción en las horas de sueño nocturno, asociado con la frecuencia de siestas y el género de los participantes.

Palabras clave: *jóvenes, diarios de sueño, percepción de calidad de sueño, tamizaje, Colombia, México.*

Resumo

Objetivos: avaliar os hábitos ea percepção da qualidade do sono em uma amostra de jovens colombianos e mexicanos. *Materiais e métodos*: utilizando a metodologia diário do sono é avaliado imediatamente ao acordar, percebeu a qualidade do sono com um questionário composto por 27 reagentes categóricas e quantitativas. *Resultados*: foram avaliados 317 estudantes do ensino médio / alto (n= 189), e na faculdade no primeiro semestre (n= 128), em Bogotá, Colômbia (n= 197), e Cidade do México (n= 120). Destes, 147 eram mulheres (46,4%) e 170 homens (53,6%). A idade média foi de 18,6 ± 2,81 anos, com uma moda e mediana de 17 anos. Alfa de Cronbach obtido a partir de 135 medições no período do estudo foi de 0,86 e 0,57, com valores médios de 27 reagentes. Houve uma correlação inversa entre as horas de sono noturno e cochilos (r= -0,12; p= 0,029). 38% dos participantes não cochilo e dormia em média 7,6 horas da noite ou mais (X2= 2,78; p= 0,047). Os homens cochilavam mais (76,5% homens; 55,6% do sexo feminino; X2= 15,26; p= 0,000). A redução de horas de uma noite de sono e precisam tomar sestas foi significativamente associada com o gênero dos participantes. A média de horas e mediana de uma noite de sono (7,2 horas) foi usado para classificar a população em dois grupos, o sono (+) 7,3 ou mais horas, eo grupo do sono (-) 7,2 horas ou menos. Estes grupos foram comparados. *Conclusões*: a população de jovens testados apresentaram uma redução nas horas de sono por noite. Isto foi associado com a frequência de cochilos e gênero dos participantes.

Palavras chave: *jovens, diários de sono, percepção da qualidade do sono de triagem, Colômbia, México.*

Sleep represents about a third of the lifespan of a person and sleep problems occur in up to 35% of the general population at any time point in life (1-2). Sleep quality perception can be assessed through self-report scales and sleep diaries. These evaluations are based on subjective ratings of qualitative aspects such as feeling rested, mood, or dream contents as well as quantitative aspects such as sleep duration, number of nocturnal awakenings and time latency to fall asleep (3). In addition to sleep quality, sleep studies should include the exploration of diurnal performance (4), especially on the cognitive and behavioural aspects (5). Patient's subjective reports are vital in sleep disorders, for example, the definition of insomnia includes subjective uneasiness associated with impairment of the ability to initiate or maintain sleep, yet perceptions vary according to individuals (6).

Around 13% of adolescents have sleep disturbances at night, while 10% report problems falling asleep (7). Psychiatric disorders such as anxiety, depression and attention deficit disorder have been shown to be associated with sleep problems, diurnal hypersomnia and higher risk of accident in teenagers (2). Suicidal depressive persons have higher rates of disorders in duration, latency and quality of sleep compared with those who are non-suicidal (8). Most studies do not segregate populations by age groups, nor assess how sleep components may change with age (9-11). A previous review pointed up some important variables that have not been included in other instruments and may provide useful information when exploring sleep components in youth populations (3) Taking into account the effect of sleep disorders on mental health and the difficulties of an adequate definition and quantification, is necessary to develop accurate and comprehensive assessments that reduce the subjectivity bias.

A questionnaire designed to evaluate sleep quality perception and sleep habits on youth, has been structured by a research group from Colombia and Mexico. This questionnaire can be used to screen sleep problems and uses a sleep diary methodology that includes categorical and quantitative items useful to examine sleep quality perceptions. Sleep diaries have been used to evaluate and quantify sleep quality perceptions and are particularly useful if completed immediately after waking up. Most of the research carried through sleep diaries methodology has been focused on the study of insomnia caused by different pathologies (12-14). A quantifiable sleep diary offers more reliable results obtained at waking time, reduces the memory bias and provides information that allows the comparison between and within individuals. The application of this instrument to evaluate the perceived daily sleep quality in youths is also adequate to study social-ecological aspects related to sleep habits and problems. Therefore, the objective of this work was to offer an initial approach in the development of a useful screening instrument. In addition, we report the results of the profile of perceived quality of sleep obtained from this population.

Materials and methods

Participants: the instrument was applied to a convenience sample of 317 students from high school (n= 189) and college (n= 128) from both Bogotá city, Colombia (n= 197) and México City, México (n= 120). There were 147 females (46,4%) and 170 males (53,6%). The mean age was 18,6 ± 2,81 years with a median and mode of 17 years and a 15-25 years range. The study received the approval from the academic institutions where the questionnaire was applied. The application of this survey was considered without risk, the researchers did not intervened the participants, and students voluntary accep-

ted or not to be part of the study. Participation was voluntary with a verbal informed consent. The application was carried on between March 2005 and January 2006.

This questionnaire is expected to be applied only during working days and for a period of five days in order to evaluate the effect of academic schedules on habits and quality of sleep perception. The first part of the instrument asks about social-demographic aspects followed by different items meant to be answered on a daily basis.

It must be answered just after waking up and takes around five minutes to complete. It also includes aspects related to sleep quality perception, diurnal performance, taking naps and the use of psychoactive substances or other sleep-altering medications.

The instrument has one categorical item about taking a nap on the previous day and nap frequency if present during the study period, 5 items measured as discrete variables and 21 ordinal items rated on a 1 to 5 "Likert" scale (see Appendix 1). Qualitative aspects evaluated include sleeping with a partner and common reported sleep interferences. This questionnaire was derived from a visual analogue scale used previously in Mexico (15) with later adjustments and corrections by research groups in Colombia and Mexico (see Appendix 1). The participants were assured that their identity and responses will remain anonymous.

Design and analysis: statistical descriptive measures were obtained from the 26 quantitative variables of the questionnaire (Likert rated). Also, nap frequency during the study period was calculated. Univariate and bivariate statistical analysis were performed.

The Cronbach's alpha coefficient was used to evaluate the reliability of the sleep questionnaire items applied in this study. This coefficient represents the reliability of an as-

sessment. This statistic measure is a weighted average of the correlations between instrument items and is a reliable result when items are highly correlated with one another.

The Hosmer-Lemeshow Test was used to assess whether or not the results were normally distributed, meaning that when the latter occurs, the graph of the results forms a bell curve (Gauss bell).

To evaluate the association between night slept hours (hr.) and the perceptions at wake time the sample mean same median of sleep hours per night (7,2 hr.) was used as a the cut-off point to split the sample into two groups: those who slept $M= 7,3$ hours or more over the five nights were termed the Sleep (+) group and those who slept $M= 7,2$ or less comprised the Sleep (−) group.

All statistical analyses in this study were performed using SPSS (Statistical Package for Social Sciences) that enables management of large databases on scientific research.

Results

Internal consistency reliability: a Cronbach's alpha of 0,86 was obtained with the SPSS software. This value was calculated from the standardized items taken from the 135 measures obtained during the five days of the instrument application (27 items, including nap frequency). The Cronbach's alpha variation was minimal after removing from the analysis the dreaming items, as occurred with removal of "Vivid or realistic dreams" item from the third night (0,85).

However, using the five-nights mean value of 27 quantitative standardized questionnaire items, Cronbach's alpha obtained with the SPSS software was 0,57 and 0,6 if nap frequency item was not included (see Questionnaire items on Appendix 1).

Sleep quality perception profile: the mean hours slept per night was 7,2 hr. (SD= 1,2), wi-

th a median of 7,2 and mode of 7,4 hours. The range obtained was 2,2 to 10,4 hours of night sleep. The data from 316 students (one failed to provide the information) showed a normal distribution (Z= 1,22; p= 0,105; Kolmogorov-Smirnov Test). Only 33% had no naps and 70% woke up at night, at least once during the five nights studied. Regarding getting out of bed at night, 42% of the students reported doing so, ranging from 1 to 22 times.

Table 1 presents the percentile distribution of the quantitative items that were grouped in the following categories: "Sleep consistence and duration", "Good sleep perception", "Negative emotional perceptions at wake up", "Bad sleep perception" "Dreaming recovery frequency", and "Dreaming content" (Table 1).

Over 50% of the participants rated higher than 3,2 the items "Satisfied with number of hours slept" and "Eager to study" at awakening; the items "Rested" and "Happy" at awakening were rated 3,4 on average, and the items of "Good mood" and "Calm" were rated 3,6 on average. A normal distribution was obtained from the variables "Rested", "Happy" and "Satisfied with hours slept" when waking up.

The "Bad Sleep" variables were not normally distributed. The highest score was on average 2,76 for "Difficulty in waking up", followed by 1,91 for "Slept poorly". None of the "Negative emotional perceptions" showed a normal distribution. The highest rating at the 50% quartile was 1,6 for "Worried" at wake up, followed in descending order by "Angry", "Irritable", "Sad" and "Frightened".

Regarding dreams, 85% recalled at least one dream, ranging from 1 to 17 over the five nights, with a lowest mean of 0,2 and a highest of 3,4 dreams per night; 72% had no nightmares, the remaining 28% had at least one nightmare during the five nights, with a range of 1 to 15 nightmares. The variables related to dream content were not normally distributed. Most students (75%) slept alone during the five nights, 13% had an occasional companion and 12% slept all nights with a companion.

Bivariate analysis

Lineal Pearson correlation analysis: an inverse correlation was found between nocturnal hours of sleep and number of naps during the five days of the study (r= -0,12, p= 0,029). The 38% of participants who reported no naps slept on average 7,6 or more hours per night, same amount for only 29% of those who took at least one nap (X^2= 2,78, p= 0,047). Men (76,5%) took more naps than women (55,6%; X^2= 15,26; p= 0,000).

Those that rated higher on "Satisfied with hours slept" reported less difficulty in waking up (X^2= 21,3; p= 0,000). The same association was found with "Good mood at waking up" and nocturnal hours slept during the five nights (X^2= 2,84; p= 0,046). The rating of "Feeling rested after waking up" was directly associated with the average of hours slept on the same period (X^2= 4,21; p= 0,04).

Group comparisons: a comparison between Sleep (+) and Sleep (-) showed that 28,2% of those who rated their night-sleep as "Bad sleep" (ratings= 2,6 to 5) were in the sleep (-) group versus 18.4% in the sleep (+) group (X^2= 4.32, p= 0.036). "Difficulty waking up" was scored with 4 or higher, more frequently in the sleep (-) (28,2%) compared with the sleep (+) (18,4%; X^2= 4,25; p= 0,039). A higher proportion of the sleep (-) group (32.4%) reported "Feeling sad at waking" than of the sleep (+) (20,4%; X^2= 5,73; p= 0,017). 84% of those that rated 3,2 or higher on "Good mood" at waking was satisfied with nocturnal hours slept, rating 2,7 or higher, while only 57,5% of those that scored less than 2,7 reported the same score for "good mood" at wake up ($X2$= 26,9; p= 0,000).

Table 1. Sleep quality perception during 5 nights in Colombian and Mexican youths. Bogotá, Colombia and México City, México, 2005-2006

Domains	# Items	Categories of Habits and Sleep quality perception	Quartiles			average	Standard deviation
			25	50	75		
Sleep consistence and duration	1	Number of hours slept	6,43	7,20	8,00	7,22	1,147
	2	Number of awakenings	0,00	1,00	1,00	0,70	0,458
	3	Number of risings at night	0,00	0,00	1,00	1,26	2,653
Dreaming recovery frequency	4	Number of recalled dreams	0,40	0,70	1,20	0,82	0,669
	5	Number of nightmares	0,00	0,00	1,00	0,28	0,448
		Likert rated items	Rating range 1-5			average	Standard deviation
Good sleep	6	Good mood at awakening	3,00	3,60	4,00	3,61	0,943
	7	Wake up refreshed	2,60	3,40	4,00	3,31	1,018
	8	Wake up eager to study	2,00	3,20	4,00	3,03	1,202
	9	Wake up happy	2,60	3,40	4,00	3,33	1,048
	10	Satisfied with hours slept	2,20	3,20	4,00	3,07	1,199
	11	Wake up calm	2,80	3,60	4,00	3,59	1,085
Negative perceptions at wake up	12	Sad at wake up	1,00	1,20	2,00	1,70	0,917
	13	Frightened at wake up	1,00	1,00	1,00	1,32	0,590
	14	Worried at wake up	1,00	1,60	3,00	1,93	1,028
	15	Angry at wake up	1,00	1,40	2,00	1,73	0,880
	16	Irritable at wake up	1,00	1,40	2,00	1,75	0,922
Bad sleep	17	Slept poorly	1,20	1,80	2,00	1,91	0,877
	18	Waking up with neck pain	1,00	1,00	2,00	1,60	0,920
	19	Waking up with back pain	1,00	1,20	2,00	1,59	0,907
	20	Difficulty in waking up	1,80	2,80	4,00	2,76	1,175
	21	Difficulty to get sleep	1,00	1,60	2,00	1,75	0,840
Content of dreams	22	Pleasant dreams	1,40	2,40	3,40	2,46	1,136
	23	Scary dreams	1,00	1,00	1,60	1,39	0,641
	24	Strange dreams	1,00	1,60	2,60	1,94	1,087
	25	Erotic dreams	1,00	1,00	1,40	1,36	0,718
	26	Vivid dreams	1,00	1,80	2,80	2,04	1,129

"Likert" rating range: 1 to 5. 1=No, 5=Yes

Use of medications and sleep profile: 44,2% (n= 13) of those that used any kind of medication with direct effects over the nervous system such as antidepressants, anticonvulsants or antihistaminergics and 66,7% (n= 37) of those that used other type of medication including contraceptives, analgesics, vitamins and anti-acne treatments were sleep (+) (*X2*= 4,34, p= 0,037).

Dreaming variables analysis: having nightmares was associated with the frequency of dreams recalled during the study. Of those that had nightmares, 96,6% (n= 84) recalled at least one dream during the five days, 80% of those without nightmares recalled the same amount of dreams (*X2*= 13,4; p= 0,000).

Sleep profile and sleeping with a companion: a 56,6% of those that raised from bed during the night, slept with a companion, at least for one night, compared with a 33,9% of those who slept alone (*X2*= 12,22; p= 0,000). Scoring 4 or higher on waking up "Happy" item was found on 44,2% of those that slept with a companion and in just 20,5% of those that slept alone (*X2*= 16,53; p= 0,000).

No association was found between the average of night-time slept hours and age, gender, alcohol consumption, smoking, marihuana, cocaine, or other substances. No association was found between the other variables and the average of hours slept.

Sleep interferences: sleep interferences mentioned by the participants were classified as external or internal depending on the origin of the disturbing stimuli. Internal interferences most commonly mentioned (n= 25) by the subjects were: emotional states among others such as anxiety, depression, stress, memories and family problems. In a descending order, 14 participants mentioned difficulties sleeping due to changes in

sleep habits or problems with circadian rhythms, 12 due to body sensations or sleep postures, 8 because of organic diseases or the use of medications, 7 blamed the ingestion of drinks, food or other more specific substances, and 6 mentioned sport practice and other physical activities or time with the partner as the interfering cause.

Regard to external sleep interferences: 13 students mentioned environmental characteristics such as light, temperature or sounds as the cause; 10 participants said it was due to academic demands including homework, exams or the mere fact of "having to study", 9 youths blamed the forced week schedule and one woman because of the obligations involved in nurturing her baby.

Discussion

The findings about the sleep characteristics in a youth population reported in this study are consistent with the observations from other authors working in comparable age populations (16-19). Despite the inherent differences from the two countries where the study was performed some sleep quality perceptions measures of youth populations evaluated showed a normal distribution, specifically, the hours slept per night and the "Good sleep" variables as wake up rested, happy, and satisfied with the hours slept. This study suggests that beside the biological changes youth populations are developing, there is an important influence of cultural and social aspects that promote changes in the sleep schedule of youths (20).

The amount of night-time slept hours found in our study (average of 7,2 hours) seems to be insufficient as almost 70% of the participants reported having at least one nap during the five days. In addition, a third of those that slept fewer hours than the average, scored with the highest mark "Difficulty to wake up".

A reduction in the number of night-sleep hours and the need to take naps were signifi-

cantly associated with the gender of the participants. A 76,5% of men took 1 or more naps during the study while only 55,6% of the women did so. One of the possible explanations for this phenomenon may be related to the work of Canadian researchers that showed a higher daily somnolence due to a late initiation of sleep in men when compared with women (21). The same relationship was found in Australian youths with the added component of an association with socio-economic characteristics of the subjects examined; the lower the social status of men, the lesser the amount of slept hours (17). The previous authors have also described a lineal tendency towards a delayed initiation of sleep in children and youths in the past 20 years. Italian authors have found a direct relationship between the age, in children and teenagers, and a late initiation of sleep (17-18). Therefore, it seems to be a general tendency in youth populations to delay the initiation of night-sleep and to sleep fewer hours per night, explained by different academic, cultural and social aspects. Nonetheless, the biological needs related to the amount of hours to be slept remains the same provoking a sleep deprivation state which manifests with negative consequences on diurnal performance (17, 21).

We found in our study that almost half of participants considered as mediocre their sleep quality regardless of the amount of hours slept [27,6% for sleep (-) and 17,7% for sleep (+) group]. In the Canadian study mentioned previously it was found that youths suffering from sleep deprivation presented with somnolence, low academic performance and reduced participation in social and extracurricular activities (21).

The "Bad sleep" perception was found to be increased by night-awakenings as reported by an 80% of individuals that had at least one night-awakening during the five days of the study. As a result, a reduction in the number of sleep hours causing sleep deprivation as well as a perception of discontinuity of sleep was identified in the examined youths. Thus, is important to further explore other disorders related to sleep interruptions (16).

85% of our participants recalled having at least one dream during the five days, this value is higher than the dream recall monthly frequencies in people under 30 years described by Austrian authors in a representative sample from that country. That study also showed that the dream recall frequency decreases with age (22). In our study, a significant association was found between the frequency of recalled dreams and the presence of nightmares corroborating the hypothesis about this relationship presented by the Austrian authors (22).

Regarding the sleep quality perception and the use of medicaments acting directly on the central nervous system it was found that a significant lesser proportion of those that used anticonvulsants, antidepressants or antihistaminics slept more hours than those that used other medications. This could be associated with the sleep induction but not maintenance properties of those substances. The effects of those medications on sleep have been described by different authors (23-25).

The inclusion of important items related to sleep quality perception such as the duration of sleep latency, night awakenings and naps, in addition to sleep outside working days (weekends and holidays) and a register of sexual activity would improve the sleep profile obtained and the internal consistence measures of the questionnaire.

Finally, the observation that a higher proportion of youths that slept with a companion reported having a better mood when waking up compared with those that slept alone may be explained by the welfare effects brought up by affective and sexual life. No detailed information was asked about this aspect, so it should be fur-

ther explored in future research. Although the results of sleeping with a companion or alone have not been conclusive, some studies inform that sleeping alone is a more restful sleep; this topic still is under discussion (26). Although, from an evolutionary point of view, in non-human primate groups and possibly in humans, the nocturnal sleep occurs in intraspecific interaction which involves being in touch and this in turn offers sleep comfort, thermoregulation and protection against the presence of predators (27-28). However, social and cultural factors are known can alter this regulation. We suggest these factors should be studied in more detail following evolutionary concepts.

The findings obtained through this study should not be extrapolated to populations of the same age from the two cities where the research was performed because the sampling was not representative. This work only evaluated the sleep quality perception from five nights and not the entire week failing to compare the sleep behaviour of working versus non-working days, something that may be important as this age-group seems to have changes in their sleep habits and quality profile according to the day of the week (29).

This perceived quality of sleep questionnaire is aimed to be used in youth population screening programs to detect probable sleep disorders that can be confirmed with more objective and specific instruments.

Another advantage is that this questionnaire looks into different components to sleepiness and insomnia explored by most commonly used instruments. This assessment evaluated elements associated with "good" or "poor" sleep like emotional, volitional, attitudinal, physical and also somatization symptoms.

Conclusions

These results constitute an initial step in the determination of a quality sleep perception profile of youth.

Further studies must be realized to provide evidence of the utility, validity and reliability of the questionnaire used in this study, including correlation with clinical evaluations and objective measurement instruments of sleep such as actigraphy.

These new explorations should include representative samples from youth populations, as well as a weekly application including all working and non-working days. Sleep deprivation and deficient sleep quality have an impact on the health and daily performance of teenagers and young adults and may affect academic performance as well as social interactions.

Conflicts of interest

All authors agree with the contents of this article and are responsible for their content, likewise declare no conflicts of interest.

Bibliografy

1. Miró E, Cano M, Buela G. Sueño y Calidad de vida. Revista Colombiana de Psicología 2005; (14):11-27.

2. Ohayon MM, Roberts RE, Zulley J, Smirne S, Priest RG. Prevalence and patterns of problematic sleep among older adolescents. J Am Acad Child Adolesc Psychiatry 2000; 39 (12):1549-56.

3. Lomeli HA, Perez-Olmos I, Talero-Gutiérrez C, Moreno CB, González-Reyes R, Palacios L et al. Sleep evaluation scales and questionaries: a review. Actas Esp. Psiquiatr. 2008; 36 (1):50-9.

4. Anders TF, Eiben LA. Pediatric sleep disorders: a review of the past 10 years. J Am. Acad. Child Adolesc. Psychiatry 1997; 36 (1):9-20.

5. Giannotti F, Cortesi F, Sebastiani T, Ottaviano S. Circadian preference, sleep and daytime behaviour in adolescence. J Sleep Res. 2002; 11 (3):191-9.

6. Escobar F, Eslava J. Validación colombiana del índice de calidad de sueño de Pittsburg. Rev. Neurol. 2005; 40 (3):150-5.

7. Lewis M. Child and adolescent psychiatry a comprehensive text book. 3rd ed. Baltimore: Lippincott Williams & Wilkins; 1996.

8. Agargün MY, Kara H, Solmaz M. Subjective sleep quality and suicidality in patients with major depression. J Psychiatr. Res. 1997; 31 (3):377-81.

9. Smith S, Trinder J. Detecting insomnia: comparison of four self-report measures of sleep in a young adult population. J Sleep Res. 2001; 10 (3):229-35.

10. Webb WB, Bonnet M, Blume G. A post-sleep inventory. Percept. Mot. Skills 1976; 43:987-93.

11. Johns MW, Gay TJ, Goodyear MD, Masterton JP. Sleep habits of healthy young adults: use of a sleep questionnaire. Br. J Prev. Soc. Med. 1971; 25 (4):236-41.

12. Manber R, Blasey C, Arnow B, Markowitz JC, Thase ME, Rush AJ et al. Assessing insomnia severity in depression: comparison of depression rating scales and sleep diaries. J Psychiatr. Res. 2005; 39 (5):481-8.

13. Khalsa SB. Treatment of chronic insomnia with yoga: a preliminary study with sleep-wake diaries. Appl. Psychophysiol. Biofeedback 2004; 29 (4):269-78.

14. Currie SR, Clark S, Rimac S, Malhotra S. Comprehensive assessment of insomnia in recovering alcoholics using daily sleep diaries and ambulatory monitoring. Alcohol Clin. Exp. Res. 2003; 27 (8): 1262-9.

15. Gruen, I. Martínez, A. Cruz-Ulloa, C. Aranday, F. Calvo, JM. Características de los fenómenos emocionales en las ensoñaciones de pacientes con epilepsia del lóbulo temporal. Salud Mental 1997; 20 (1):8-15.

16. Kotagal S, Pianosi P. Sleep disorders in children and adolescents. BMJ 2006; 332 (7545): 828-32.

17. Dollman J, Ridley K, Olds T, Lowe E. Trends in the duration of school-day sleep among 10- to 15-year-old South Australians between 1985 and 2004. Acta Paediatr. 2007; 96 (7):1011-4.

18. Russo PM, Bruni O, Lucidi F, Ferri R, Violani C. Sleep habits and circadian preference in Italian children and adolescents. J Sleep Res. 2007; 16 (2):163-9.

19. Yang CK, Kim JK, Patel SR, Lee JH. Age-related changes in sleep/wake patterns among Korean teenagers. Pediatrics 2005; 115 (S 1):250-6.

20. Crowley SJ, Acebo C, Carskadon MA. Sleep,circadian rythms and delayed phase in adolescence. Sleep Med. 2007; 8 (6):602-12.

21. Gibson ES, Powles AC, Thabane L, O'Brien S, Molnar DS, Trajanovic N et al. "Sleepiness" is serious in adolescence: two surveys of 3235 Canadian students. BMC Public Health 2006, (6). [Consultado el 06 de junio de 2009]. Disponible en http://www.biomedcentral.com/1471-2458/6/116

22. Stepansky R, Holzinger B, Schmeiser-Rieder A, Saletu B, Kunze M, Zeitlhofer J. Austrian dream behavior: results of a representative population survey. Dreaming 1998; 8 (1):23-30.

"Sleep quality perception in youth population"

23. Bent S, Padula A, Moore D, Patterson M, Mehling W. Valerian for sleep: a systematic review and meta-analysis. Am J Med. 2006; 119 (12):1005-12.

24. Barbanoj MJ, Riba J, Clos S, Giménez S, Grasa E, Romero S. Daytime Ayahuasca administration modulates REM and slow-wave sleep in healthy volunteers. Psychopharmacology (Berl). 2008; 196 (2):315-26.

25. Meltzer LJ, Mindell JA, Owens JA, Byars KC. Use of sleep medications in hospitalized pediatric patients. Pediatrics 2007; 119 (6):1047-55.

26. Dittami J, Keckeis M, Machatschke I, Katina S, Zeithofer J, Kloesch G. Sex differences in the reactions to sleeping in pairs versus sleeping alone in humans. Sleep and Biological Rhythms. 2007; 5 (4):271-6.

27. Anderson JR. Sleep-related behavioural adaptations in free-ranging anthropoid primates. Sleep Med. Rev. 2000; 4 (4):355-73.

28. Muñoz-Delgado J, Luna-Villegas G, Mondragón-Ceballos R, Fernández-Guardiola A. Behavioral characterization of sleep in stumptail macaques (Macaca arctoides) in exterior captivity by means of high-sensitivity videorecording. American Journal of Primatology 1995; 36 (3):245-9.

29. García-Jiménez MA, Salcedo-Aguilar F, Rodríguez-Almonacid FM, Redondo-Martínez MP, Monterde-Aznar ML, Marcos-Navarro AI et al. The prevalence of sleep disorders among adolescents in Cuenca, Spain. Rev. Neurol. 2004; 39 (1):18-24.

Appendix 1

Encuesta subjetiva sobre percepción de calidad del sueño (México-Colombia 2005-2006)

Iniciales del nombre: _____
Institución: _____ Curso actual _____ Código _____

Fecha de nacimiento DD/MM/AAAA_____ Edad (años cumplidos):_____

Fecha de inicio: Día ___ Mes ___ Año ____
Sexo: Masc. □ Fem. □

Gracias por participar en esta investigación. Por favor responde las siguientes preguntas y lee bien las instrucciones en cada sección.
Estoy tomando estos medicamentos:

_____

Para mujeres en edad fértil. Fecha de mi última menstruación: Día_____ Mes_____

Marca con una X en la casilla del día correspondiente si la noche anterior consumiste alguna de las siguientes sustancias. Escribe dentro del paréntesis la cantidad consumida como se indica en la tabla:

	Cantidad aproximada	Día de registro				
		Día 1	Día 2	Día 3	Día 4	Día 5
Cigarrillo	Cantidad de cigarrillos	( )	( )	( )	( )	( )
Alcohol	Cantidad de copas o cervezas	( )	( )	( )	( )	( )
Marihuana	Cantidad de cigarros	( )	( )	( )	( )	( )
Cocaína	Cantidad de líneas	( )	( )	( )	( )	( )
Otra sustancia ¿cuál?		( )	( )	( )	( )	( )

Responde Sí o No según el caso:

	Día de registro				
	Fecha 1 DD/MM/AA	Fecha 2 DD/MM/AA	Fecha 3 DD/MM/AA	Fecha 4 DD/MM/AA	Fecha 5 DD/MM/AA
¿Dormiste ayer en algún momento del día?					

Contesta las siguientes preguntas lo mejor que puedas:

Reactivos	Día de registro				
	Fecha 1 DD/MM/AA	Fecha 2 DD/MM/AA	Fecha 3 DD/MM/AA	Fecha 4 DD/MM/AA	Fecha 5 DD/MM/AA
1. Número de horas dormidas					
2. Número de despertares nocturnos					
3. Número de veces en que me levanté en la noche					
4. Cuántos sueños recuerdo haber tenido					
5. Cuántas pesadillas tuve					

Responde las siguientes preguntas considerando la siguiente escala donde Sí equivale a 5 puntos y No equivale a 1 punto. Escribe el número de tu respuesta en la casilla del día correspondiente.

Escala						
No	1	2	3	4	5	Sí

Ejemplo:	Día de registro				
	Fecha 1 DD/MM/AA 05/11/05	Fecha 2 DD/MM/AA 07/11/05	Fecha 3 DD/MM/AA 08/11/05	Fecha 4 DD/MM/AA 09/11/05	Fecha 5 DD/MM/AA 10/11/05
Me levanté con el cuello adolorido	1	2	1	4	5

Reactivos	Día de registro				
	Fecha 1 DD/MM/AA	Fecha 2 DD/MM/AA	Fecha 3 DD/MM/AA	Fecha 4 DD/MM/AA	Fecha 5 DD/MM/AA
6. Me levanté de buen humor					
7. Me siento descansado al despertar					
8. Siento que dormí mal					
9. Me levanté con el cuello adolorido					
10. Amanecí con dolor de espalda					
11. Me fue difícil despertar					
12. Me fue difícil dormir					
13. Hoy siento ganas de trabajar o estudiar					
14. Me siento contento al despertar					
15. Me siento triste al despertar					
16. Desperté asustado en la mañana					
17. Al despertar me siento preocupado o intranquilo					
18. Tuve sueños agradables					
19. Tuve sueños de miedo					
20. Tuve sueños extraños					
21. Tuve sueños eróticos					
22. Tuve sueños muy reales (vívidos)					
23. Me siento satisfecho con el número de horas que dormí					
24. Me siento tranquilo al despertar					
25. Me siento enojado al despertar					
26. Me siento irritable al despertar					
En las siguientes preguntas responde solamente Sí o No					
27. Dormí acompañado					
28. Dormí solo					

Observaciones: registrar factores que puedan interferir con tu sueño habitualmente