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SLEEP DISORDERS IN PREGNANCY

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ABSTRACT: *Context:* The precise function of sleep in animals and human beings is still unknown, and any sort of physical, social or psychological variation may change the normal sleep-wake cycle. *Purpose:* This research aims is to determine the sleep disorders (SD) for each of the three trimesters of the pregnancy comparing them to the pre-pregnancy state (PG). *Method:* SD were investigated in three hundred pregnant women 11- to 40-years-old through with a brief clinical interview based on directed questions. One hundred pregnant women were considered for each trimester. *Results:* The rate of pregnant women with insomnia increased by 23% in the 2nd trimester (p< 0.005); the rate for excessive daytime sleepiness (EDS) by 15% in the 1st trimester (p<0.003), 55% in the 2nd trimester (p<0.001) and by 14% in the 3rd trimester (p<0.002); the rate for mild sleepiness increased by 33% in the 2nd trimester (p<0.002) and by 48% in the 3rd trimester (p<0.001); the rate for specific awakenings increased by 63% in the 1st trimester, by 80% in the 2nd trimester and by 84% in the 3rd trimester (p<0.001). *Conclusion:* SD were more frequent during pregnancy comparatively to PG state, mostly at the expenses of EDS and specific awakenings.

KEY WORDS: pregnancy, sleep disorders, awakening, insomnia, excessive daytime sleepiness.

Distúrbios do sono na gravidez

RESUMO - *Introdução:* A função exata do sono em animais e seres humanos ainda é desconhecida e qualquer variação física, social ou psíquica pode alterar o ciclo normal de sono e vigília. *Objetivo:* O objetivo desta pesquisa é detectar os principais distúrbios do sono (DS) nos três trimestres da gravidez comparando-os ao estado pré-gestacional (PG). *Método:* Os DS foram investigados em 300 gestantes com idades variando de 11 a 40 anos, através de breve entrevista com questões dirigidas. Foram incluídas 100 gestantes para cada trimestre. *Resultados:* A proporção de grávidas com insônia aumentou 23% no 2º trimestre (p<0,005); a de sonolência intensa 15% no 1º trimestre (p<0,003), 55% no 2º (p<0,001) e 14% no 3º (p<0,002); a de sonolência leve 33% no 2º trimestre (p<0,002) e 48% no 3º (p<0,001); a de despertares específicos 63% no 1º trimestre, 80% no 2º e 84% no 3º (p<0,001). *Conclusão:* DS foram mais freqüentes durante a gravidez comparativamente ao PG, principalmente às custas de sonolência intensa e despertares específicos.

PALAVRAS-CHAVE: gravidez, distúrbios do sono, despertar, insônia, sonolência excessiva diurna.

It is not known the precise function of sleep in animals and human beings. The main explanation considers the need to replenish individual's energy (physical and psychological). The restoration provided by sleep seems to be an important component, once it is preceded by fatigue and usually followed by feelings of satisfaction. When there is an impossibility to sleep well, restrictions in day functioning or excessive daytime sleepiness (EDS) may occur[1-2]. Physical, emotional and social variations in human beings' life may induce sleep disorders as insomnia and EDS. The gravidic-puerperal cycle is a peculiar and exclusive period of changes and new experiences for women. It may be as well an important determinant for pregnant women's sleep pattern alterations.

Emotional state are frequent and important during pregnancy, being defined by organic changes, by the expectation created due to the new condition as mother, by the fear of professional life changes as consequence of maternity and by the apprehension connected to the new roles that she will be performing in the familiar context[3]. About 2/3 of the pregnant women consider their sleep pattern abnormal and the complaints are connected to the anatomical and physiological changes associated with pregnancy and the size of the uterus. It gets harder to find a comfortable position during sleep and the pressure caused by the size of the fetus increases the

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number of bathroom visits during the night[4]. Expectation concerning the childbirth, the baby and others fears during this period can potentialize anxiety[5]. During normal pregnancy, symptoms in multigravidas and primigravidas were studied, and the five more significant ones were: frequent urination, fatigue, pelvic pressure, insomnia and back pain, and they have appeared more frequently than mentioned in obstetric texts[6]. The third trimester of pregnancy is associated to the great number of symptoms that disappear after childbirth, mainly maintenance insomnia[7,8]. Changes in breathing physiology during pregnancy due to hormonal and mechanical factors, predispose the woman to sleep-breathing disorders[9,10] and any condition that causes maternal hypoxemia will affect sleep negatively, particularly the supine position in the final period of pregnancy[2,11]. Snoring by the end of pregnancy is associated with hypertension, clinical condition related to the reduction of fetal growth and low birth weight[12]. However, the subject "sleep-pregnancy" remains unfamiliar, polisomnographic studies or specific clinical evaluations are limited over this period and, pre natal physicians not aware of sleep disorders may not provide pregnant women appropriate care to the presence of such occurrences in each trimester of pregnancy.

Sleep disorders (SD) may be associated with behavior and cultural aspects of a specific population, and this motivated us to study the prevalence of such disorders in a Brazilian population of pregnant outpatients from São Paulo regarding to the pre-pregnancy state (PG).

METHOD

Three hundred, 11- to 40-years-old pregnant women were interviewed in the outpatients clinic at the Obstetrics Department of UNIFESP-EPM, Casa do Amparo Maternal and Vila Mariana Health Center, all in Sao Paulo SP, Brazil. The protocol was approved by the Ethics Research Committee of UNIFESP (#1116/00).

The pregnant women were classified in three groups, composed each one of 100 women according to the trimester: 1st trimester (T1), 2nd trimester (T2) and 3rd trimester (T3). The groups were constituted in an independent way and no pregnant woman was represented first in a group and later in another during the course of pregnancy. An anamnesis was performed according to the following questions, always considering the PG state: 1) Do you have any difficulty to fall asleep when you lie down in bed? 2) Do you wake up too early in the morning (earlier than you are supposed to)? 3) If you wake up during the night, do you find it difficulty to sleep again? 4) Has anyone ever told you that you snore? 5) Has anybody ever said that you have difficulty in breathing during the night (like stop breathing)? 6) Do you suddenly fall asleep during the day or in the middle of some kind of activity? 7) Do you fall asleep anywhere (as on buses, in the classroom, at work or while driving)? 8) Do you feel sleepy during the day? 9) Have you been taking naps during the day? 10) Do you wake up with the baby movements? 11) Do you wake up because of abdominal pains or contractions? 12) Do you wake up due to dreams or nightmares involving the baby or to childbirth? 13) Do you wake up with heartburn?

The interviews happened at the outpatients clinic waiting room, before the appointment with the doctor, lasting a maximum of 15 minutes, without any previous notification, at random days and time so to avoid that possible sleep disorders patients would be scheduled by the Clinic staff to be evaluated by the researchers.

During the interviews, none of the pregnant women had any difficulty in understanding and answering the questions, nor in recognizing the period of pregnancy they found themselves in. Being a brief anamnesis many questions whose answers were not clear, like "sometimes", "once in a while" and other similar ones, for this study were considered as negative (no) in relation to the focus of interest contained in the assertive. We also considered as negative (no) the events that occurred with a frequency smaller than three times per week.

The interviewer's subjective feelings in what concerns the answers have also been taken into consideration when deciding the presence (yes) or the absence (no) in what was being asked.

We took into account the following dependent variables: 1) insomnia, 2) sleep breathing disorders, 3) excessive daytime sleepiness (EDS), 4) mild sleepiness, 5) specific awakenings[13].

In this research we considered with *insomnia*, the pregnant women who informed having hard time to fall asleep after lying down, or difficulty to get back to sleep in case they woke up in the middle of the night. We determined as *breathing sleep disorders*, when the pregnant woman informed to snore or was aware of stopping breathing when sleeping. We considered *EDS* when they feel asleep suddenly during some activity or in inappropriate places or occasions

Table 1. Number of pregnant women that presented insomnia, sleep breathing disorders, excessive daytime sleepiness mild sleepiness and specific awakenings in comparison to the literature's population data.

Sleep disorders	Observed N = 300	Expected in the population	Prevalence (% population)	Standard deviation
Insomnia	143 *	45	15	38.3
Sleep breathing disorders	113 *	6	2	5.9
Excessive daytime sleepiness	54 *	19.5	6.5	18.2
Mild sleepiness	113 *	19.5	6.5	18.2
Specific awakenings	22	#	#	#

(* $p<0.001$; # there is no population reference).

Table 2. Percentage differences (%) of sleep disorders found in the pre-pregnancy state in relation to the 1st trimester.

Sleep disorders	% PG	% T1	PG and T1 difference
Insomnia	56	64	8
Sleep breathing disorders	41	33	- 8
Excessive daytime sleepiness	23	38	15 *
Mild sleepiness	49	83	34
Specific awakenings	9	72	63 *

(* p<0.005}.

Table 3. Percentage differences (%) of sleep disorders found in the pre-pregnancy state in relation to the 2nd trimester.

Sleep disorders	% PG	% T2	PG and T2 difference
insomnia	47	70	23 *
Sleep breathing disorders	38	44	6
Excessive daytime sleepiness	16	71	55 *
Mild sleepiness	39	72	33 *
Specific awakenings	8	89	80 *

(* p<0.005).

Table 4. Percentage differences (%) of sleep disorders found in the pre-pregnancy state in relation to the 3rd trimester.

Sleep disorders	% PG	% T3	PG and T3 differences
insomnia	40	39	-1
Sleep breathing disorders	34	45	11
Excessive daytime sleepiness	15	29	14 *
Mild sleepiness	25	73	48 *
Specific awakenings	5	89	84 *

(* p<0.005)

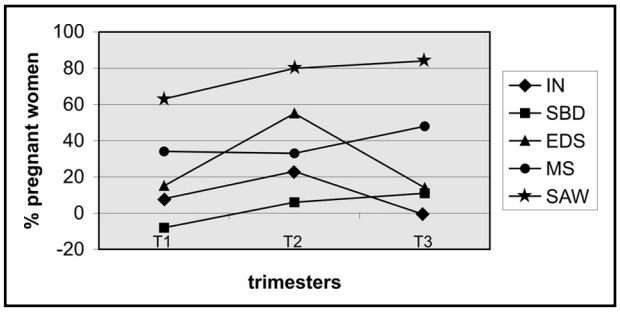

Fig 1. Difference among pregnant women percentages that presented sleep disorders: insomnia (IN), sleep breathing disorders (SBD), excessive daytime sleepiness (EDS), mild sleepiness (MS) and specific awakenings (SAW) in the three trimesters of pregnancy (T1, T2 and T3).

(i.e.: bus, church, classroom, driving) and *mild sleepiness* when they informed to fell sleepier during the day or that they have been taking naps. We classified as *specific awakenings* those associated to the baby movements, dreams or nightmares related to pregnancy, abdominal contractions and heartburn. Data was analyzed using Qui-square test and Fisher's exact test. Alpha smaller than 5% has been adopted for nullity hypothesis rejection.

RESULTS

Our sample of pregnant women presented: 143 cases of insomnia (expected value of 45, p<0.001); 113 cases of sleep breathing disorder (expected value of 6, p<0.001); 54 cases of EDS (expected value of 20, p<0.001); 113 cases of mild sleepiness (expected value of 20, p<0.001); 22 cases of specific awakenings, having no expected population data for this symptom (Table 1)[2].

The insomnia prevalence was not different between the pregnant women of the T1 and T3 (Tables 2 and 4) when compared to the PG state. In the T2 however (Table 3), there was an increase of 23% in insomnia complaints (p<0.005). On sleep breathing disorders the results were not different comparing the pre-pregnancy period and all trimesters of pregnancy (Tables 2, 3 and 4). In relation to PG (Tables 2, 3 and 4) the rate of pregnant women with EDS was increased by 15% in the T1 (p<0.003), 55% in the T2 (p<0.001) and by 14% in the T3 (p<0.002). The rate of pregnant women with mild sleepiness was not different within the T1. In the T2 there was an increase of 33% (p<0.002) and in the T3 the increase detected was of 48% (p<0.001).The Specific Awakenings were very prevalent (p<0.001). in the T1, T2 and T3 compared to the PG state (T1=63%; T2 =80%; T3=84% - Fig 1).

DISCUSSION

The interview carried out at the outpatients clinic waiting room resulted in a high number of positive answers (yes) related to sleep disorders in both, PG and pregnancy periods. Despite simple and brief, this anamnesis has been demonstrating itself quite useful and successfully accepted by other researchers [6,8,9,14].

The insomnia in our study was more prevalent in the T2, presenting itself different from the existing literature which is not unanimous about the period of higher prevalence[15]. We did not investigate the reasons for this occurrence, however it

could be associated to the late psychological perception of pregnancy in the studied population. Most pregnant women arrive at the Health Public Services for care when already in the 2nd trimester of pregnancy, suggesting that only in this period women begin to realize the responsibilities and changes that are happening or are about to happen in their lives. Once anxiety and concerns are important cause of insomnia, we believe that these issues are likely to surface somewhat later in the Brazilian population studied by us, coinciding with their perception of pregnancy, occasion in which pregnant women begin to adapt for their new reality[16-19].

Unlike from other studies, our results on sleep breathing disorders were not statistically different in the PG period nor in any of the trimesters of pregnancy, maybe because these symptoms are usually noticed by people in very close contact to the pregnant women who happened not to be present in most of the interviews, making it difficult to proceed to an objective investigation. This fact reinforces the use of polisomnography to evaluate of snoring and apnea[9,11,20,21].

Although non-significant, our data shows that some pregnant women who had sleep breathing disorder during the PG period presented less occurrences in T1 (Fig 1).

We observed a higher prevalence of sleep disorders in the PG state relatively to the expected for the non pregnant population, which leads us to suppose whether the fact of experiencing pregnancy at the moment of the interview could induce them to giving positive answers (yes) to the questions. The cognitive processes associated with the pregnant woman's understanding of her present condition seem to extend to the PG state, producing a biased set of memories[22]. As a result of this fact another consequence arises: answers given in the T2 and T3 might have suffered influences of the experiences related to the sleep pattern of previous trimesters. An explanation for this fact may be the slow and progressive development of pregnancy itself, allowing the association of current experiences with those evoked by the memory. Another interpretation for what we found lies on the psychoanalytic view regarding the psychic functioning[23] where some experiences are incorporated to the past rewriting the individual's history or as an adaptative mechanism that allows the individual to integrate with his/her psychic history (emotional memory).

Although specific awakenings are common during pregnancy, surprisingly we obtained positive answers (yes) in the PG period. Obviously specific awakenings could not be present when the woman is not yet pregnant, which confirms the hypothesis that the emotional memory can influence the interviewee's answers.

The percentage of pregnant woman with EDS increased in all the three trimesters of pregnancy, while the one of mild sleepiness increased in the second and in the third trimesters. Progesterone may be related with the EDS at the beginning of pregnancy because a metabolite of this hormone seems to work as a barbiturate, linking to the cerebral gabaergic receptors[24]. Our results differ from some reports in literature where sleep pattern alterations, changes in quality and duration of sleep, and EDS are found mostly in the first trimester of pregnancy[21], and also, in some degree, in the 2nd trimester[25].

In our sample we found larger proportion of pregnant women with sleep disorders than the expected for general population, suggesting that pregnancy has important participation in altering the pre-pregnancy sleep patterns. The main sleep disorders were insomnia, EDS, mild sleepiness and specific awakenings. The sleep breathing disorders, although frequent, were not more prevalent in pregnancy comparatively to the PG state.

REFERENCES

1. Culebras A. Clinical handbook of sleep disorders. Boston: Butterworth-Heinemann, 1996:1-11.
2. Kryger MH, Roth T, Dement WC. Principles and practice of sleep medicine. 3.Ed. Philadelphia: Saunders, 2000.
3. Maldonado MT, Mello J. Filho Psicossomática hoje. Porto Alegre: Artes Médicas, 1992:208-241.
4. Reite M, Nagel K, Ruddy J. Concise guide to evaluation and management of sleep disorders. Washington: American Psychiatric Press, 1990:169-176.
5. Rocha FL. Distúrbios psiquiátricos na gravidez e puerpério: atualização. Rio de Janeiro: Científica Nacional, 1991.
6. Zib M, Lim L, Walters WA. Symptoms during normal pregnancy: a prospective controlled study. Aust N Z J Obstet Gynecol 1999;39:401-410.
7. Hertz G, Fast A, Feinsilver H, Albertario CL, Schulman H, Fein AM. Sleep in normal late pregnancy. Sleep 1992;15:246-251.
8. Mindell JA, Jacobson BJ. Sleep disturbances during pregnancy. J Obstet Gynecol Neonatal Nurs 2000;29:509-517.
9. Santiago JR, Nolledo MS, Kinzler W, Santiago TV. Sleep and sleep disorders in pregnancy. Ann Intern Med 2001;134:398-408.
10. Guilleminault C, Querra-Salva M, Chowdhuri S, Poyares D. Normal pregnancy, daytime sleeping, snoring and blood pressure. Sleep Med 2000;1:289-297.
11. Feinsilver SH, Hertz G. Respiration during sleep in pregnancy. Clin Chest Med 1992;13:637-644.
12. Franklin KA, Holmegren PE, Jonsson F, Poromaa N, Stenlund H, Svanborg E. Snoring, pregnancy-induced hipertension, and growth retardation of the fetus. Chest 2000;17:137-141.
13. The International Classification of Sleep Disorders - Diagnostic and Coding Manual. American Sleep Disorders Association. Kansas: Allen Press, 1990.
14. Gozal D Jr, Pope DW. Snoring during early childhood and academic performance at ages thirteen to fourteen years. Pediatrics 2001;107:1394-1399.
15. Suzuki S, Dennerstein L, Greenwood KM, Armstrong SM, Satohisa E. Sleeping patterns during pregnancy in Japanese women. J Psychosom Obstet Gynaecol 1994;15:19-26.
16. Lopes EA, Silva AB, Prado GF, et al. Sleep complaints in the pregnancy. Sleep 2002, 25(Suppl):A383.
17. Lopes EA, Carvalho LB, Silva AB, et al. Sleep disorders in pregnancy. Sleep 2003, 26(Suppl) abstract: A355.
18. Carvalho LBC, Lopes EA, Silva L, et al. Personality features in a sample of psychophysiological insomnia patientes. Arq Neuropsiquiatr, 2003;61:588-590.
19. Carvalho JEC. A representação social da função do médico e da medicina entre grávidas no contexto da Previdência Social. Dissertação de Mestrado da Universidade de São Paulo, São Paulo, 1994.
20. Edwards N, Middleton PG, Blyton DM, Sillivan CE. Sleep disordered breathing and pregnancy. Thorax 2002;57:555-558.
21. Lefcourt LA, Rodis JF. Obstructive sleep apnea in pregnancy. Obstet Gynaecol Surg 1996;51:503–506.
22. Casey P, Huntsdale C, Angus G, Janes C. Memory in pregnancy: II: implicit, incidental, explicit, semantic, short-term, working and prospec-

tive memory in primigravid, multigravid and pospartum women. Psychosom Obstet Gynaecol 1999;20:158-164.

23. Freud, S. Projeto de uma psicologia para neurologistas. In Obras Completas (Vol I). 4.Ed. Madrid: Biblioteca Nueva, 1981:209–276.
24. Majewska MD, Harrison NL, Schwartz RD, et al. Steroid hormone metabolites are barbituratelike modulators of the GABA receptor. Science 1986;(232):1004-1007.
25. Pien GW, Fife D, Scewab RJ, Pack AI. Serial assessment of daytime somnolence in pregnant women with the Epworth Sleepiness Scale. Sleep 2002;25(Suppl):A.385–386.