

QUALITY OF SLEEP IN POSTOPERATIVE SURGICAL ONCOLOGIC PATIENTS¹

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This study aimed to evaluate surgical-oncologic patients' quality of sleep through the Pittsburgh Sleep Quality Index (PSQI) questionnaire. It is an exploratory study with transversal-observational design, in 46 postoperative head & neck and urology cancer patients. The PSQI questionnaire was used to evaluate the subjective quality of sleep and the occurrence of sleep disorders. Six PSQI components were statistically significant and 78.3% of the interviewees had impaired subjective quality of sleep. Among factors leading to sleep disorders we point out: taking too long to fall asleep; waking up in the middle of the night; getting up to go to the bathroom and napping during the day. This study is expected to sensitize the nursing team regarding the need to investigate quality of sleep and causes of its disorders in cancer survivors for an effective course of action.

DESCRIPTORS: sleep disorders; neoplasms; surgery; nursing care

LA CALIDAD DEL SUEÑO EN PACIENTES SOMETIDOS A CIRUGÍA ONCOLÓGICA

El objetivo del estudio fue evaluar la calidad del sueño en pacientes quirúrgicos oncológicos, utilizando el cuestionario Índice de Calidad del Sueño de Pittsburgh (PSQI), para mensurar la calidad subjetiva del sueño y la ocurrencia de disturbios. Consistió en una investigación con delineamiento observacional transversal, envolviendo 46 pacientes con diagnóstico de cáncer, sometidos a procedimientos quirúrgicos de las especialidades Cabeza Cuello y Urología. Seis componentes del PSQI fueron estadísticamente significativos y 73,9% de los entrevistados presentaron comprometimiento de la calidad del sueño. Entre las causas de los disturbios del sueño se destaca: demorar para dormir, despertar en el medio de la noche, levantarse para ir al baño y dormir durante el día. Se espera que este estudio sensibilice al equipo de enfermería sobre la necesidad de investigar la calidad y las causas de los disturbios del sueño en sobrevivientes de cáncer, para que haya una intervención efectiva.

DESCRIPTORES: trastornos del sueño; neoplasias; cirugía; atención de enfermería

QUALIDADE DO SONO EM PACIENTES SUBMETIDOS À CIRURGIA ONCOLÓGICA

O objetivo do estudo foi avaliar a qualidade do sono em pacientes cirúrgicos oncológicos, utilizando o questionário Índice de Qualidade do Sono de Pittsburgh (PSQI), para mensurar a qualidade subjetiva do sono e a ocorrência de seus distúrbios. Consistiu em pesquisa com delineamento observacional-transversal, envolvendo 46 pacientes com diagnóstico de câncer, submetidos a procedimentos cirúrgicos das especialidades Cabeça e Pescoço e Urologia. Seis componentes do PSQI foram estatisticamente significantes e 73,9% dos entrevistados apresentaram comprometimento da qualidade do sono. Entre as causas dos distúrbios do sono destaca-se: demorar para dormir, acordar no meio da noite, levantar para ir ao banheiro e cochilar durante o dia. Espera-se que este estudo sensibilize a equipe de enfermagem quanto à necessidade de investigar a qualidade e as causas de distúrbios do sono em sobreviventes do câncer, para que haja intervenção efetiva.

DESCRIPTORES: transtornos do sono; neoplasias; cirurgia; assistência de enfermagem

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INTRODUCTION

According to the National Cancer Institute in Brazil, the incidence of cancer increases at the same rate as the population ages due to increased expectation of life. According to the institute, surgery is still one of the main treatments for 60% of patients. Many tumors can be treated only with surgery while others need to be treated with a combination of surgery and radiotherapy and/or chemotherapy⁽¹⁾.

The sleep disorders experienced by cancer patients can occur in different periods of the course of the disease: at the point of diagnosis, during and after treatment and in its final phase. The incidence of this disorder for these patients is expressive because it is about 30 to 50% when compared to 15% in the population in general. In addition, 23% to 44% of cancer patients present this symptom after two or five years of treatment⁽²⁾.

Sleep is well organized and structured in cycles of NREM-REM, which occur about four or five times during the night. A young and healthy adult enters sleep through NREM stages or phases. Stage one is a brief transitional period between being awake and asleep, which lasts five minutes and is considered light sleep. The stage two lasts 10 to 20 minutes during the initial cycle and is considered true physiological sleep. Stages 3 and 4, also called delta or slow waves, are the deepest ones and can last 20 to 40 minutes in the first cycle. The initial sequence is followed by a return to stages 4, 3 and 2, followed by a REM episode. The first REM period occurs 70 to 90 minutes after the beginning of sleep, normally with a short duration of five to 15 minutes. In general, the four or five REM episodes have their duration lengthen during the night⁽³⁾.

The whole sleep regulatory mechanism described above is altered in cancer patients due to several reasons and can cause insomnia, difficulty in falling asleep, drowsiness, nightmares, sleep interruptions in the middle of the night, staying awake for long periods, difficulties resuming sleep, waking up too early in the morning and napping during the day⁽⁴⁾.

The authors of this study became concerned with the theme after analyzing the Oncology Nursing Society (ONS)⁽⁵⁾ Research Agenda Priority areas, published from 2005 to 2009. It highlights the

consequences of sleep disorders on the quality of life of cancer patients and points out it is a little studied and, consequently, little understood field. Thus, the ONS launched the challenge to nurses working within the field of oncology to study the theme, so that these disorders and their consequences in patients' lives are detected and evaluated with a view to develop a knowledge base for safe nursing interventions.

Accordingly, when the Brazilian literature in nursing was searched, we noted that the sleep theme is an incipient field with few studies published in the country. Three studies are highlighted because they contribute to understanding the issue concerning people with diabetes⁽⁶⁾, women undergoing elective gynecological surgeries⁽⁷⁾, and women with gynecological and breast cancers⁽⁸⁾.

The authors became motivated to develop this study working as professors and researchers in the field of Oncologic Nursing Surgery and aimed to evaluate the quality of sleep in oncologic surgery patients from the head and neck and urology specialties through the Pittsburgh Sleep Quality Index (PSQI). Expectations are that the results will contribute to knowledge in the field because they provide a support for planning care delivery to cancer patients with sleep disorders.

Patients from the head and neck and urology specialties were selected due to the large number of both large and medium oncologic surgeries performed every year at the institution. These are also fields in which the main author teaches and delivers services for the community, which facilitated the agreement of the surgeons responsible for approving the study.

METHOD

This study is an exploratory study with a transversal-observational design in which participants are evaluated a single time⁽⁹⁾. The study population was composed of all oncologic surgery patients from the head and neck and oncology specialties at a hospital and who met the following inclusion criteria: patients with the diagnosis of cancer and who underwent head and neck and urologic surgery, one up to six months postoperative, attended return visits in the outpatients' facility from October 2007 to March 2008, both genders, older than 18 years of age, able

to communicate, agreed to participate in the study and signed a free and informed consent agreement.

Data were collected at the *Associação de Combate ao Câncer do Brasil Central* [Association to Combat Cancer of Central Brazil] in Uberaba, MG, Brazil in a convenience sample. Data collection was carried out at the outpatients' facility in the postoperative period of patients who agreed to participate. Forty-six patients met the selection criteria: 30.4% (14) from the head and neck specialty and 69.6% (32) from the urology specialty.

The study was approved by the Ethics Research Committee at the Federal University of the Triângulo Mineiro and authorized by the hospital's Clinical director (Protocol No. 984).

The Pittsburg Sleep Quality Index (PSQI) was used for data collection and another instrument was developed to identify patients' social and clinical characteristics. The PSQI was validated for the Brazilian culture⁽¹⁰⁾. This instrument was used to evaluate the subjective quality of sleep and occurrence of its disorders. It contains ten questions, items one to four are open questions and five to ten are semi-open questions. If interviewees wished and deemed necessary they could add comments to any of the questions in space provided for that.

The PSQI has seven components: the first is the subjective quality of sleep, that is, the individual perception of sleep quality; the second is sleep latency; the third is sleep duration, obtained through the relation between the number of hours slept and the number of hours spent in bed, not necessarily sleeping; the fourth is related to habitual sleep efficiency; the fifth is sleep disorders, that is, situations that compromise sleep hours; the sixth is the use of medications, that is, whether the patient uses medications to sleep; the seventh is related to diurnal sleepiness and disorders during the day and refers to alterations in disposition and enthusiasm to perform daily tasks⁽⁶⁾.

When the instrument was applied, patients were oriented to answer questions considering their sleep habits only during the last month, in the majority of days and nights.

The global score is determined by the sum of the seven components and each one received a score between zero and three points. The maximum instrument score is 21. Scores higher than five indicate a poor quality of sleep pattern.

A database was created using Excel[®] and then transferred to the Statistical Package for the Social Sciences (SPSS) for analysis.

The PSQI's internal consistency was checked by Cronbach's alpha coefficient. This is obtained after a single application of the measurement instrument, which produces values between 0 and one or between 0 and 100%. When it is higher than 70% we say the measures are reliable. All correlations (p) between each item score and the total score of the remaining items were calculated⁽¹¹⁾. For this study, $p < 0.05$ was considered statistically significant.

The variables of the ten questions are presented through descriptive statistical analysis, frequency and percentage. Average, standard deviation and statistical significance (ANOVA) of the PSQI components in relation to the global score were also computed. This parametric test of the analysis of variance is used to estimate the real average value of quantitative variables and real percentage of some events of interest.

RESULTS

Thirty-five (76.1%) participants out of 46 were men; five (10.9%) were between 30 and 50 years of age, 30 (65.2%) between 50 and 70, and 11 (23.9%) were between 70 and 90 years of age.

Fourteen (30.4%) participants had up to one minimum wage salary; 19 (41.3%) had one to two minimum wage salaries, 12 (26.1%) had two to three and one (2.2%) participant had more than four minimum wage salaries. One (2.2%) participant was illiterate, 23 (50%) had not completed elementary school, 13 (28.3%) had completed elementary school, three (6.5%) had not completed high school, four (8.7%) had completed high school and two (4.3%) had bachelors' degrees.

Regarding how long had passed since the postoperative period, four (8.7%) patients reported up to two months post surgery, 12 (26%) between two and three months, nine (19.6%) patients between three and four months, another nine (19.6%) between four and five months and 12 (26.1%) patients reported between five and six months post surgery. Regarding adjuvant and neoadjuvant treatments, 45 (97.8%) were not submitted to any pre-surgery treatment and

34 (73.9%) were not submitted to any other treatment in the postoperative period.

In regard to the diagnosis, 14 (30.4%) patients had head and neck cancer and 32 (69.6%) had cancer in the urinary tract. Regarding the localization of the tumor, ten (21%) had the tumor in the thyroid, two (4.3%) in the larynx, another two (4.3%) in the floor of the mouth, 28 (60.9%) in the prostate, two (4.3%) in the penis, one (2.2%) in the bladder and one (2.2%) in the kidney.

The PSQI was submitted to Cronbach's alpha and the result was 0.79, higher than 0.70, which indicates the items high internal consistency and homogeneity⁽¹¹⁾. In relation to the PSQI global score, 34 (73.9%) scored higher than five, which indicates their subjective quality of sleep was compromised.

Table 1 presents the answers to the PSQI's first four open questions and tables 2 and 3 refer to the semi-open questions from five to ten with items' frequency and percentage.

We observed that the most frequent time to go to bed was between 9 and 11 P.M. for 80.4% of the participants, 37% took up to 15 minutes to sleep, 54.3% woke up after six to seven hours of sleep and 26.1% slept six to seven hours per night on average.

Table 1 – Frequencies and percentage of participants' answers to the PSQI semi-open questions. Uberaba, MG, Brazil 2008

Questions	Answers	F	%
1- What time did you go to bed?	19–21h	7	15.2
	21–23h	37	80.4
	23–1h	1	2.2
	1–3h	0	0
	3–5h	1	2.2
2- How long (in minutes) did you take to fall to sleep?	< o = 15min	17	37
	16-30min	15	32.6
	31-60min	8	17.4
	> 60min	6	13
3- What time did you get out of bed in the morning?	3–4h	1	2.2
	4–5h	2	4.3
	5–6h	13	28.3
	6–7h	25	54.3
	> 7h	5	10.9
4- How many hours did you sleep per night?	1–2h	1	2.2
	2–3h	2	4.3
	3–4h	7	15.2
	4–5h	9	19.6
	5–6h	5	10.9
	6–7h	12	26.1
	7–8h	5	10.9
	8–9h	3	6.5
	9–10h	2	4.3

Table 2 – Frequency and percentage of participants' answers in the PSQI semi-open questions. Uberaba (MG), 2008

Questions	1		2		3		4		Total	
	F	%	F	%	F	%	F	%	F	%
5a) Take more than thirty minutes to sleep	16	34.7	-	-	11	23.9	19	41.3	46	100
5b) Wake up in the middle of night or too early in the morning	6	13	1	2.2	7	15.2	32	69.5	46	100
5c) Wake up to go to the bathroom	3	6.5	5	10.9	5	10.9	33	71.7	46	100
5d) Have difficulty breathing	38	82.6	-	-	3	6.5	5	10.9	46	100
5e) Cough or snore loudly	41	89.1	1	2.2	1	2.2	3	6.5	46	100
5f) Feel too cold	44	95.6	1	2.2	-	-	1	2.2	46	100
5g) Feel too hot	36	78.3	2	4.3	3	6.5	5	10.9	46	100
5h) Have bad dreams or nightmares	34	73.9	4	8.7	4	8.7	4	8.7	46	100
6- Have good quality of sleep	9	19.6	18	39.1	14	30.4	5	10.9	46	100
7- Take medication to sleep	39	84.7	1	2.2	1	2.2	5	10.9	46	100
8- Difficulty in staying awake while driving	23	50	4	8.7	16	34.8	3	6.5	46	100
9- Have indisposition or lack of enthusiasm	17	36.9	19	41.3	4	8.7	6	13	46	100

not once, 2- less than once a week, 3- once or twice a week and 4- three times a week or more

Some items are noteworthy like the 19 patients (41.3%) who take more than thirty minutes to fall to sleep, 32 (69.5%) who wake up in the middle of the night or too early in the morning and 33 (71.7%) who wake up to go the bathroom.

Table 3 presents the results concerning question number ten, which is related to the meaning

of sleep and of the habit of taking a nap or not. The answers to this question are not summed up, that is, they are not computed in any of the seven components and therefore are not part of the instrument global score. However, the answers of patients who have a habit of taking a nap help to understand the subjective quality of sleep.

Table 3 – Frequency and percentage of patients' answers to the PSQI question 10. Uberaba (MG), 2008

Sleeping for you means	N	%
Pleasure	5	10.9
Need	41	89.1
Total	46	100
You nap		
Yes	34	73.9
No	12	26.1
Total	46	100
If Yes - you nap intentionally		
Yes	34	100
No	-	-
Total	34	100
Napping for you means		
Pleasure	21	45.6
Need	13	28.3
Total	34	100

According to Table 3, 41(89.1%) patients consider sleeping a necessity. Table 4 relates average, standard deviation and level of statistical significance of the PSQI components in relation to the instrument global score. These were obtained through the parametric test of analysis of variance (ANOVA) for the 46 interviewees.

Table 4 – Average, standard deviation and statistical significance of the PSQI components in relation to its global score. Uberaba (MG), 2008.

Scale	Scores	Variable	Average	Standard deviation	Level of significance
PSQI	Comp 1	0	3.50	1.31	0.000*
		1	8	3.01	
		2	10.79	2.89	
		3	16	2.53	
	Comp 2	0	5.92	3.45	0.000*
		1	5.17	2.23	
		2	10	3.56	
	Comp 3	0	4.17	1.60	0.000*
		1	6.35	3.24	
		2	10	1.41	
		3	13.29	2.91	
	Comp 4	0	4.80	2.62	0.000*
1		5.50	1		
2		10	2.12		
3		13.06	2.98		
Comp 6	0	8.56	3.96	0.048**	
	1	4	-		
	2	13	-		
	3	13.60	6.23		
Comp 7	0	5.62	2.84	0.001*	
	1	8.87	3.58		
	2	11.43	3.82		
	3	13.25	6.70		

* p≤0.001
** p<0.05

Only component five was not statistically significant and therefore was not included in Table 4.

Table 5 presents the results of the parametric test ANOVA with values statistically significant in relation to the instrument items, which refer to patients' social and clinical characteristics.

Table 5 – Average, standard deviation and statistical significance of sociodemographic and clinical variables in relation to the PSQI global score. Uberaba (MG), 2008

Scale	Scores	Variable	Average	Standard Deviation	Level of significance
Global (PSQI)	Income	1	13	4.13	0.000*
		2	8	3.04	
		3	6.83	4.06	
		4	3	-	
	Schooling	1	15	-	0.040**
		2	9.22	3.83	
		3	11	4.76	
		4	7.33	6.11	
	Site of cancer	1	8.25	3.82	0.023**
		2	15	-	
		3	8.50	4.95	
		4	8.30	4.19	
		6	14.60	5.37	

* p<0.001
** p<0.05

The ANOVA test revealed three statistically significant scores: economic income, schooling and site of cancer.

DISCUSSION

Forty-one (89.1%) patients were older than 50 years of age, which is in accordance with the literature because age is an important risk factor for all types of cancer since the incidence and mortality of the disease increase exponentially after 50 years of age⁽¹⁾.

Statistical significance was not found in relation to the quality of sleep with age and gender.

Income up to two minimum wage salaries (71.7%) and schooling up to elementary school (80.5%) indicate patients who live in poor living conditions due to their lack of professional qualifications and low educational level. They also have limited access to public services such as the health and educational systems, which limit preventive

practices and early detection⁽¹²⁾. These social characteristics can also hinder the knowledge of these patients regarding complementary treatments that can minimize sleep disorders. Financial difficulties can also generate worries that interfere with sleep patterns. A systematic review⁽¹³⁾ that evaluated the use of alternative and complementary treatments among patients with cancer shows that patients who use these therapies are those with a high level of education and high family income.

These findings are compatible with the findings of this study because income and schooling were statistically significant in relation to the PSQI global score, confirming the importance of these aspects for the sleep quality of these patients.

A study⁽⁸⁾ evaluating the sleep quality of women with cancer, however, shows different results because the level of education was similar among individuals with good and poor quality of usual sleep (average of 4.5 and 5 years of schooling, respectively) as well as family income: five minimum wage salaries predominated (in 91.7% of the participants with good sleep patterns and in 84.6% of those with poor sleep patterns).

The site of cancer was also a statistically significant variable ($p=0.023$). It is known that the site and stage of the disease determine the kind of treatment chosen and also affect the recovery and quality of life of those who survive it⁽¹⁴⁾. In patients submitted to prostatectomy, the average quality of sleep, according to the PSQI global score, was 8.25. In this group, one of the causes disturbing their sleep was the need to wake in the middle of the night to go to the bathroom, usually leaving them unable to fall back to sleep; another factor was the preoccupation of not being able to keep an active sexual life with their partners.

Although the frequency of patients submitted to chemotherapy and radiotherapy was small, one cannot forget to mention the importance of these therapies for sleep quality. Cancer patients who were submitted to specific treatments in the last six months were more subject to problems of excessive somnolence⁽⁸⁾.

Twenty-four (52.2%) patients in this sample slept less than six hours on average. This finding differs from another study⁽¹⁵⁾ with 123 cancer patients in which 95% of the individuals had an average of 6.58 hours of sleep. However, the literature⁽¹⁶⁾ also reveals that when sleep disorders exist before the

disease, the symptoms worsen in 58% of the patients after the diagnosis.

Another study that focused on the poor sleep quality of cancer patients⁽⁸⁾ highlighted the following problems: early waking (92%) and the need to go to the bathroom (92%), followed by episodes of pain (69.3%) and sensation of heat during the night (46.2%). These findings are similar to those of this study in which 27 (58.7%) patients reported poor or very poor sleep patterns.

Regarding the habit of napping (answers to the PSQI question ten) Table 3 shows that 34 (73.9%) participants reported they intentionally take a nap during the day. We also observed that 21 (45.6%) consider napping to be pleasurable and 13 (28.3%) consider it a necessity. The act of napping in the morning or afternoon was also found in 39% of the respondents of another study and 60 % of them nap at least three times a week⁽¹⁶⁾. Thus, naps during the day might be associated with interrupted sleep during the night, which in turn contributes to poor sleep quality.

Hence, when the PSQI components are jointly evaluated in relation to the global score we have a better understanding of the relation between them. A person who sleeps less than five hours per night and takes more than thirty minutes to fall asleep is considered to have a poor quality of sleep and consequently might become sleepy during the day and feel the need to nap.

Disorders in sleep patterns indicate sleep is being harmed by environmental and/or personal factors. It is important to note that studying the multiple symptoms of cancer is a complex task because of the differences found in the origin of the disease and specific symptoms. Some symptoms are related to the disease and others are related to the treatment (i.e. nausea and vomiting can be the result of intestinal obstruction or chemotherapy); or yet symptoms can be related to the disease and treatment (i.e. fatigue); and there is also the possibility that one or more symptoms are triggered by another symptom (sleep disorder that can lead to fatigue)⁽¹⁴⁾.

Sleep patterns have to be determined in order to evaluate whether sleep quality is adequate. For that, professionals in the health field should investigate patients' routines so as to determine the time when they go to bed, how long they take to fall to sleep, sleep duration, number of times they wake during the night, how long they take to resume sleeping and

the time they wake up. These data can help to determine the sleep patterns of patients and professionals to perceive whether there was any change after the diagnosis of cancer and/or treatment⁽¹⁷⁾.

Based on the above, implementing interventions so that cancer patients acquire healthy sleep habits include: keep a regular time to sleep and wake up (even during weekends); go to bed only when feeling sleepy; get up when not able to resume sleeping after 15-20 minutes and go to another room, then perform a non-stimulating activity until feeling sleepy; sleep only the necessary amount; exercise regularly, which should be done four to six hours before going to bed; eat a light meal before going to bed; avoid heavy foods; reduce the level of noise and light; avoid stimulants such as nicotine, food and drinks with caffeine four to six hours before going to bed (i.e. chocolate, coffee and soft drinks); avoid drinking alcohol because it causes nocturnal waking; avoid napping during the day, or limit it to 20 minutes, and avoid napping after 3PM⁽¹⁷⁾.

CONCLUSIONS

This study aimed to evaluate the sleep quality of 46 surgical cancer patients in the head and neck

and urology specialties through the Pittsburgh Sleep Quality Index and a specific instrument to identify the social and clinical characteristics of patients.

Results show that all patients value sleep and the main disorders are: taking too long to fall sleep and discontinued nocturnal sleep.

Income, schooling and site of the disease were statistically significant factors for quality of sleep. The participants expressed the need to nap during the day, which can be a necessity for some, but might lead, at the same time, to disorders in nocturnal sleep.

Comparing the results of this study with other studies we find that there are differences in sleep quality among groups of cancer patients, which lead to the conclusion that focusing on the site of disease and specific treatments leads to more accurate results.

This study presents some limitations due to the heterogeneous sample because the consequences of surgeries in the head and neck are different from urological ones. The sample is composed of 46 patients, which can be considered a small number if compared to the number of cancer patients attended per year at the institution. Another limitation is related to the transversal-observational design. A longitudinal study can complement the evaluation of sleep quality in different stages of the disease. Such limitations can be overcome in future studies.

REFERENCES

1. Ministério da Saúde [homepage na Internet]. Secretaria de Atenção à Saúde: Instituto Nacional de Câncer; [Acesso em 2008 fevereiro 15]. Estimativas 2008: Incidência de Câncer no Brasil; [96 telas]. Disponível em: <http://www.inca.gov.br/estimativa/2008/versaofinal.pdf>
2. Vachani C. Insomnia in the patient with cancer. *Oncolink–Abramson Cancer Center of the University of Pennsylvania* [serial online] 2007 Apr [cited 2007 may 17]; (1): [about 4 screens]. Available from: <http://www.oncolink.com/coping/article.cfm?c=5&s=69&ss=116&id=709>
3. Savard J, Morin CM. Insomnia in the context of cancer: a review of a neglected problem. *J Clin Oncol* 2001 February; 19(3):895-908.
4. Kaplow R. Sleep deprivation and psychosocial impact in acutely ill cancer patients. *Crit Care Nurs Clin North Am* 2005 September; 17(3):225-37.
5. Oncology Nursing Society [homepage on the Internet]. Pittsburgh: Oncology Nursing Society (ONS); [cited 2007 September]; 2005 – 2009 ONS Research Agenda; [2 screens]. Available from: <http://www.ons.org/research/information/documents/pdfs/talking05.pdf>
6. Cunha MCB, Zanetti MLH, Vanderlei J. Sleep quality in type 2 diabetics. *Rev Latino-am Enfermagem* 2008; 16(5):850-5.
7. Zaros MC, Ceolim MF. Sleep/wake cycle of women submitted to elective gynecological surgery with a one-day hospital stay. *Rev Latino-am Enfermagem* 2008; 16(5):838-43.
8. Furlani R, Ceolim MF. Sleep quality of women with gynecological and breast cancer. *Rev Latino-am Enfermagem* 2006 dezembro; 14(6):872-8.
9. Polit FD, Beck CT, Hungler BP. *Fundamentos de Pesquisa em Enfermagem: métodos, avaliação e utilização*. 5ª ed. Porto Alegre (RGS): Artmed; 2004.
10. Ceolim MF. *Padrões de atividades e de fragmentação do sono em pessoas idosas [tese]*. Ribeirão Preto (SP): Escola de Enfermagem de Ribeirão Preto/ USP; 1999.
11. Martins GA. *Sobre confiabilidade e validade*. RBGN 2006; 8(20):1-12.
12. Guimarães RM, Romanelli G. A inserção de adolescentes no mercado de trabalho através de uma ONG. *Psicol Estudo* 2002 julho/dezembro; 7(2):117-26.
13. Spadacio C, Barros NF. *Uso de medicinas alternativas e complementares por pacientes com câncer: revisão*

sistemática. Rev Saúde Pública 2008 fevereiro; 42(1):158-64.

14. Beck SL, Dudley WN, Barsevick A. Pain, sleep disturbance, and fatigue in patients with cancer: using a mediation model to test a symptom cluster. *Oncol Nurs Forum* 2005 May; 32(3):542-65.
15. Mercadante S, Girelli D, Casuccio A. Sleep disorders in

advanced cancer patients: prevalence and factors associated. *Support Care Cancer* 2004 May; 12(5):355-9.

16. Davidson JR, Macleana AW, Brundage MD, Schulzec K. Sleep disturbance in cancer patients. *Social Science & Medicine* 2002 May; 54(9):1309-21.
17. O'donnell JF. Insomnia in Cancer Patients. *Clin Cornerstone* 2004; 6 Suppl:6-14.