Fatigue among nursing undergraduate students*

FADIGA ENTRE ESTUDANTES DE GRADUAÇÃO EM ENFERMAGEM

LA FATIGA ENTRE LOS ESTUDIANTES DE ENFERMERÍA

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ABSTRACT

Fatigue among students may harm their learning. This study evaluated the fatigue of nursing undergraduate students and its relations to their graduation year, participation in extracurricular activities, people with whom they lived, depression and their body mass index (BMI)). The study had the participation of 189 (60.2%) students from the EEUSP, from which 96.2% were women with the average age of 21.6 years old, 80.9% lived with their parents, 43.9% performed extracurricular activities, 24.8% had varied BMI and 22.2% presented dysphoria or depression (Beck Depression Inventory). Fatigue was moderate/intense for 83.5% of the students (Piper Fatigue Scale - Revised and Fatigue Pictogram) and 59.8% reported moderate/intense impairment in their habitual activities. Fatigue presented a positive correlation to the graduation year, to the BMI and to depression (p<0.001). The academic activity was the main cause of fatigue, whereas sleep and leisure were the most frequent strategies to handle it. Fatigue was significant and intense, but there was an irregularity between its frequency, magnitude and impact in the daily life activities.

KEY WORDS

Fatigue.
Students, nursing.
Learning.
Activities of daily living.

RESUMO

A fadiga entre os estudantes pode prejudicar a aprendizagem. Avaliou-se a fadiga de graduandos de enfermagem e as relações com o ano de graduação, a participação em atividades extracurriculares, com quem o aluno reside, com a depressão e o índice de massa corporal (IMC). Participaram 189 (60,2%) estudantes da EEUSP, sendo 96,2% de mulheres com idade média de 21,6 anos, 80,9% residiam com os pais, 43,9% realizavam atividades extracurriculares, 24,8% tinham IMC alterado e 22,2% apresentaram disforia ou depressão (Inventário de Depressão de Beck). A fadiga foi moderada/intensa para 83,5% dos estudantes (Escala de Fadiga de Piper Revisada e Pictograma de Fadiga) e 59,8% relataram prejuízo moderado/intenso nas atividades habituais. A fadiga apresentou correlação positiva com ano de graduação, com o IMC e a depressão (p<0,001). A atividade acadêmica foi a principal causa de fadiga, enquanto o sono e o lazer foram as estratégias mais utilizadas para seu manejo. A fadiga foi significativa e intensa, todavia observou-se descompasso entre freqüência, magnitude e impacto da fadiga nas atividades da vida diária.

DESCRITORES

Fadiga.
Estudantes de enfermagem.
Aprendizagem.
Atividades cotidianas.

RESUMEN

La fatiga en los estudiantes puede ser perjudicial para el aprendizaje. Se evaluó la fatiga en estudiantes de enfermería y sus relaciones con el año de estudio, participación en actividades extracurriculares, personas con las que el alumno reside, depresión e índice de masa corporal (IMC). Participaron 189 (60,2%) estudiantes de la EEUSP; 96,2% mujeres, edad media de 21,6 años, 80,9% residía con sus padres, 43,9% realizaba actividades extracurriculares, 24,8% exhibía alteraciones en su IMC y 22,2% presentaban disforia o depresión (Inventario de Depresión de Beck). La fatiga fue moderada/intensa para el 83,5% de los estudiantes (Escala de Fatiga de Piper Revisada y Pictograma de Fatiga), y 59,8% refirieron perjuicio moderado/intenso en las actividades habituales. La fatiga presentó correlación positiva con el año de estudio, con el IMC y con la depresión (p < 0,001). La actividad académica fue la principal causa de fatiga, sueño y recreación fueron las estrategias más utilizadas en su control. La fatiga fue significativa e intensa, aunque se observaron divergencias entre frecuencia, magnitud e impacto de la fatiga en las actividades de la vida diaria.

DESCRIPTORES

Fatiga.
Estudiantes de enfermería.
Aprendizaje.
Actividades cotidianas.

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INTRODUCTION

Fatigue is a universal phenomenon experienced by both healthy and sick people. Despite differences in definitions of fatigue, a consensus exists that it is a subjective, multifactorial and multidimensional phenomenon. It is considered an

> unpleasant physical sensation, with cognitive and emotional components, described as tiredness that is not relieved with common strategies to restore energy. Its duration and intensity vary and it reduces, to different extents, the ability to perform usual activities[1].

This definition covers the three relevant aspects of the fatigue concept: the verbalization of tiredness or exhaustion, decreased ability to perform habitual activities and lack of relief for these manifestations obtained by common strategies to restore energy.

Fatigue prevalence varies according to the population group. Studies of fatigue in healthy people are incipient. In an epidemiological study in Norway, 11.4% of people showed considerable fatigue[2]. This percentage is high, considering that fatigue interferes in people's ability to perform normal activities. In a Brazilian research involving workers at a printing company, prevalence levels were 37.5% for severe and 7% for chronic fatigue, and higher among women in both cases[3].

Data on prevalence, impact and fatigue-related factors among healthy people can contribute to comparisons with sick populations and distinctions between preventive and curative actions. There are signs that fatigue in healthy people may be closely associated with emotional state, while fatigue in people with somatic diseases is a symptom more related with organic causes and a strong predictor of physical impairment[4].

Despite the small number of studies involving college students, particularly in nursing, some suggest that fatigue may exist and that, in this population, it can limit the learning process, impair professional education and quality of life. A study on stress in nursing students observed symptoms of mental stress, sleep disorders and other physically expressed symptoms[5]. A preliminary study on moral abuse among nursing students observed that a large part (76.8%) complained of excessive tiredness[6]. And a study of nursing students at a private college showed that college experiences can promote good quality of life or not[7].

A study among medical students found that 27.8% of the sample presented mild to moderate depression symptoms, 10.7% moderate to severe and 2.1% severe[8]. This finding, associated with countless studies that indicate the relation between fatigue and depression, aroused the researchers' interest to assess depression among nursing students.

Depression affects about 6% of the general population and is twice as frequent in women. Fifty percent of patients are between 20 and 50 years of age (mean 40 years) and, generally, it occurs among people without intimate personal relations, divorced or separated[9].

Besides depression, different mood disorders and other factors can cause or aggravate fatigue. Doing too much activity or for too long can produce both physical and mental exhaustion. It is known that many undergraduate nursing courses, like at the School of Nursing at the University of São Paulo, are full-time and demand the students' dedication to different course subjects, generating physical and psychological exhaustion. In addition, many of these students are involved in extracurricular activities, demanding extra efforts, or live alone, which implies the obligation of housekeeping.

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To identify the presence of fatigue and its impact, an assessment is needed that comprises the symptom's different dimensions. Various multidimensional and self-report fatigue instruments exist, which is an important characteristic in the assessment of subjective phenomena. Among these, the Revised - Piper Fatigue Scale stands out, which is easy to understand and used in different population groups, in various countries, permitting result comparisons. Another interesting instrument is the Fatigue Pictogram, which assesses fatigue intensity and its impact on the ability to perform usual activities by choosing illustrations with subtitles. Both the Revised - Piper Fatigue Scale and the Fatigue Pictogram were used in this study. The validity and reliability of these instruments have been analyzed for healthy and ill Brazilian subjects[10-11].

In view of the small number of studies on fatigue in a healthy and young population, the researchers decided to analyze fatigue among nursing students and explore the relations between fatigue and sociodemographic, physical and emotional variables.

OBJECTIVES

- Quantify and qualify fatigue among undergraduate nursing students at EEUSP;
- Analyze the relation between fatigue and gender, age, whom the student lives with, engagement in extracurricular activity, BMI and depression.

METHOD

A cross-sectional, descriptive and exploratory research was undertaken. The population included students enrolled in the Undergraduate Nursing Program at the University of São Paulo. Data were collected in the first semester of 2006. After being informed on the research goals, students who agreed to participate signed two copies of the Informed Consent Term. Among all enrolled students (N=314), 189 (60.2%) answered the instruments. Losses referred to refusal to participate (n=18, 5.7%), absence from the classroom on the day of data collection (n=105, 33.4%) and the two students (0.6%) who collected the data.

Approval for the study was obtained from the Research Ethics Committee at the University of São Paulo School of Nursing (process No 21/2005/CPq/EEUSP).

Data were collected in class during the morning period. The group of participants received information on the study goals and doubts were clarified. The following instruments were used: Identification Form, the Revised - Piper Fatigue Scale[10], the Fatigue Pictogram[11] and the Beck Depression Inventory[12].

The dependent variable was fatigue and independent variables were gender, age, whom the student lives with, engagement in extracurricular activities, weight and height. These data were used to characterize the population and analyze their correlations with the fatigue variable.

The presence and intensity of the nursing students' fatigue was analyzed through the Revised - Piper Fatigue Scale and the Fatigue Pictogram.

The Revised - Piper Fatigue Scale is a multidimensional, self-report instrument, comprising 22 items, ranging from 0 to 10, which assess the following fatigue dimensions: behavioral/intensity (6 items), cognitive/mood (6 items), affective (5 items) and sensory (5 items). Both a total score (0 to 10) and scores per domain (0 to 10) can be obtained. Higher scores indicate greater fatigue. The psychometric properties of the Piper Fatigue Scale were tested for the present study population[10]. The reliability of the scale dimensions, assessed through Cronbach's alpha, ranged between 0.86 and 0.88. Factorial analysis confirmed the four instrument dimensions and the items' factors loaded between 0.558 and 0.900. Besides these items, the scale contains four open-ended questions, not used to calculate the scale score, so that respondents can provide further information on their fatigue experience.

The Fatigue Pictogram is a self-report instrument with two items that assess fatigue intensity and its impact on the development of activities. Each item is assessed through subtitled illustrations. Psychometric property tests in Brazilian individuals showed adequate stability ($p<0.001$) for this instrument and ability to distinguish between fatigued and healthy individuals[11].

The Beck Depression Inventory, validated for Portuguese[12], comprises 21 items, with assertions ranging from 0 to 3. Total scores vary between 0 and 63 and the following cut scores are adopted for population without a previous depression diagnosis: scores between 0 and 15, absence of depression; between 16 and 20, dysphoria, and above 20, compatible with depressive symptoms.

Data were organized in Microsoft Excel® worksheets and described as absolute and relative frequencies, mean, median, standard deviations and variances. Spearman's correlation test using the SPSS version 13.0 were performed to analyze relations between fatigue and depression, whom the student lives with, development of extracurricular activities, undergraduate course year and BMI.

RESULTS

Table 1 summarizes data on gender, age, whom the student lives with, development of extracurricular activity, BMI and depression according to undergraduate course year.

Most students were female and lived with their parents; the mean age was 21.6 years (SD=2.8), about 13% performed extracurricular activities, 11% were overweight and about 20% showed BDI scores indicating dysphoria or depression. Fatigue scores are presented in Tables 2 and 3.

Among the students, 158 (83.5%) referred feeling between moderately and extremely tired and 113 (59.8%) referred that the fatigue caused moderate to severe impairment.

Fatigue was less severe in the first year and in the behavioral domain (Table 3).

Table 1 - Characterization of nursing students, in total and per undergraduate course year - São Paulo - 2006

Variables		1st Year n=42 (22,2%)		2nd Year n=46 (24,3%)		3rd Year n=55 (29,1%)		4th Year n=46 (24,3%)		Total N=189 (100%)	
Gender		N	%	N	%	N	%	N	%	N	%
	F	40	95,2	46	100	52	94,6	44	95,7	182	96,2
	M	2	4,8	0	0	3	5,4	2	4,3	7	3,8
Age	Mean (SD)	19,95 (DP=3,3)		20,6 (DP=1,8)		22,1 (DP=2,7)		23,2 (DP=1,9)		21,6 (DP=2,8)	
	Median	20		20		22		23		21	
	Variance	16-35		18-25		19-39		20-31		16-39	
	Not informed	n= 01 (2,4%)		n=0 (0%)		n=0 (0%)		n=0 (0%)		N=01 (0,52%)	
Whom student lives		N	%	N	%	N	%	N	%	N	%
	Alone	01	2,4	0	0	02	3,6	02	4,3	05	2,7
	With parents	38	90,5	38	82,6	48	87,3	29	63	153	80,9
	With partner	0	0	03	6,5	01	1,8	01	2,2	05	2,7
	In a sorority	03	7,1	04	8,7	04	7,3	13	28,3	24	12,7
	Not informed	0	0	01	2,2	0	0	1	2,2	2	1
Accomplishment of Extracurricular Activity	None	38	90,5	27	58,7	22	40	19	41,3	106	56,1
	1-2	04	9,5	19	41,3	27	49,1	26	56,5	76	40,2
	3 or +	0	0	0	0	06	10,9	01	2,2	07	3,7
BMI	<18,5	05	11,9	05	10,9	10	18,2	01	2,2	21	11
	18,5-24,99	32	76,2	37	80,4	35	63,6	35	76,1	139	73,6
	25-29,99	03	7,1	03	6,5	08	14,6	08	17,3	27	11,6
	≥30	0	0	01	2,2	02	3,6	01	2,2	4	2,2
	Not informed	02	4,8	0	0	0	0	01	2,2	3	1,6
Depression (BDI)	Mean (SD)	9,97 (6,29)		11,76 (6,66)		10,6 (9,5)		11,32 (6,57)		10,92 (7,48)	
	Median	9		10		7		11		10	
	Variance	1-29		0-28		0-41		2-26		0-41	
		N	%	N	%	N	%	N	%	N	%
	0-15 (absence of depression)	36	85,8	36	78,3	41	74,6	34	73,9	147	77,8
	16-20 (dysphoria)	03	7,1	03	6,5	06	10,9	07	15,2	19	10
	21-63 (depressive symptoms)	03	7,1	07	15,2	08	14,5	05	10,9	23	12,2

Table 2 - Fatigue Pictogram - São Paulo - 2006

Tiredness Intensity	N	%	Impact of tiredness on activities	N	%
Nothing	2	1.1	I do everything	11	5.8
A little	29	15.3	I do almost everything	65	34.4
Moderate	84	44.4	I do something	65	34.4
Very	60	31.7	I do only what I have to	43	22.8
Extremely	14	7.4	I do very little	5	2.6
TOTAL	**189**	**100**	**TOTAL**	**189**	**100**

Table 3 - Piper Fatigue Scale scores per undergraduate course year - São Paulo - 2006

Year		1st	2nd	3rd	4th	Total
Behavioral Domain	Mean	4.5	4.9	4.7	5.1	4.8
	Median	4.8	5	4.2	5.3	5
	SD	1.9	2	2.3	2.1	2.1
	Variation	0-7.8	0-8.3	0.7-9.2	0-8.8	0-9.2
Affective Domain	Mean	4.8	5.4	5.3	5.5	5.2
	Median	4.8	5.4	5.2	5.4	5.4
	SD	1.9	1.9	2.3	2.1	2
	Variation	0-8.2	0-9.2	0-9.2	0-.94	0-9.4
Sensory Domain	Mean	5.2	5.1	5.2	5.3	5.2
	Median	5.4	5.2	5.6	5.4	5.4
	SD	1.7	1.7	2.6	2.1	2
	Variation	0-8.8	0-8.2	0.4-9.4	0-9.8	0-9.8
Cognitive Domain/ Mood	Mean	4.9	5	5.2	5.5	5.1
	Median	4.7	5	5.2	5.8	5.2
	SD	1.8	1.6	2.4	2.2	2
	Variation	0-9.2	0-8	0.3-9.3	0-9.7	0-9.7
Total Score	Median	4.8	5.1	5.1	5.3	5.1
	Median	4.8	5.3	5.1	5.6	5.3
	SD	1.5	1.5	2.2	1.9	1.8
	Variation	0-7.9	0-7.7	0.8-9	0-8.2	0-9

For 44.4% of the students, the main cause of fatigue is related to the characteristics of the nursing course, such as the great study load, excessive number of disciplines, papers, tests, and tiresome and long classes. In addition, 31.2% of the students mentioned daily activity overload and lack of time to perform them. Other causes of fatigue were: sleep disorders (26.4%); distance between home and college and public transport conditions (22.2%); emotional burden (19.6%); health or financial problems, inadequate diet, physical effort, lack of physical activity and sleeping too much (9%); lack of leisure and relaxation (6.3%); extracurricular activities or activities not related with professional education (5.8%); family problems or conflicting interpersonal relationship (5.3%) and change in routine (2.6%). Some answers (5.3%) could not be categorized. The mean number of answers per student was approximately 1.8 and only one student did not answer the question on the cause of fatigue.

Regarding fatigue management, the strategies the students most used were sleep with quality (64.5%) and leisure (63.5%). Other measures mentioned to relieve the state of fatigue were resting or relaxing (14.3%); sports (7.4%); taking a shower (3.2%), and others such as religious practices, cleaning one's room, not studying, solving problems and decreasing worries, not losing class, using medication, contact with nature and massage (7.9%). One answer appointed that the adopted strategy depends on the irritability level (0.5%). The mean number of answers per student was 1.6, and only one student did not give an opinion.

Fatigue showed a positive and statistically significant correlation with the variables course year, BMI and depression, but the correlation was good with depression only (Table 4). These data indicate that the first year was described as less tiresome than the others and that a higher BMI and a higher depression score were correlated with more severe fatigue. Fatigue also showed a weak negative correlation with age and gender (men reported feeling more fatigue than women and younger students presented higher scores of fatigue). No significant correlation was found between fatigue and extracurricular activity and between fatigue and whom the student lived with (Table 4).

Table 4 - Correlation and significance between fatigue and sociodemographic variables, BMI and mood - São Paulo - 2006

	Age	Gender	Course year	Extracurricular activity	Whom student lives with	BMI	Depression
Correlation (r)	-0.043	-0.148	0.137	0.009	0.009	0.128	0.612
P-value	0.006	0.000	0.000	0.588	0.574	0.000	0.000

DISCUSSION

Data on the nursing students' characteristics confirmed the expected profile of students in this undergraduate course. Female students prevailed, in line with the profession's historical characteristics. Groups from different course years were homogeneous in terms of gender, age, whom they lived with, BMI and presence of depression symptoms.

Deviations from normal BMI should be highlighted. As shown in Table 1, 55 (24.8%) students showed inadequate weight (overweight, obesity or low weight). It should be reminded that, although it is an easy and fast method to assess the fat level, the BMI does not distinguish body fat from lean body mass. Furthermore, race, age and gender differences should be taken into account for a reliable distinction of overweight, obese and low-weight individuals. Nevertheless, the percentage of non-normal measures was remarkable.

High rates of fatigue were found, both according to the Fatigue Pictogram and the Revised - Piper Fatigue Scale. About 83.5% of the nursing students complained of moderate and severe fatigue, which was surprising (Table 2 and Table 3). Based on the analysis of these data, one can suppose that the students were confused on the meaning of fatigue and tiredness, since these are not the same. Fatigue is reported as a tiredness not relieved with strategies commonly used for energy restoration. The students mentioned sleep and leisure though (common energy restoration strategies), as the main strategies they use to relieve fatigue. Perhaps including

the fatigue concept at the start of each instrument can be useful for a better understanding of the concept.

Despite the high frequency of moderate or severe fatigue (83.5%), 59.8% of the students mentioned moderate or severe interference in usual activities (Table 2). This indicates that, for 23.7% of the students, moderate and severe fatigue did not correspond to a moderate and severe impact. This supports the hypothesis that the concepts of fatigue and tiredness are not clear, considering the fact that the students referred good coping with fatigue, performing the habitual activities, which is not observed in fatigued individuals.

The students referred components of fatigue in all dimensions of the instrument, but it was slightly less referred in the behavioral dimension (Table 3). This difference is small. Nevertheless, it can be inferred that, for the students, the affective, sensory and cognitive-mood components of fatigue are more relevant than the behavioral component.

Forty-four percent of the students mentioned the characteristics of the nursing course as the primary factor to cause fatigue, given the psychic, physical and mental exhaustion due to curricular activities. This finding matches various literature reports that indicate a highly stressful environment in nursing education[13]. The second cause the students described was excess of activities, and the third was sleep disorders. It is known that activities, when excessive or carried out for a long period, can contribute to the emergence of fatigue. A study of home caregivers appointed that sleep interruption increased the perception of fatigue and culminated in physical disorders and reduced mental energy when compared with uninterrupted sleep[14]. The characteristics of the nursing course, excess of activities and sleep problems, besides other causes of fatigue the students mentioned, should be included in future research as variables that can be related with fatigue.

Although the reported fatigue severity is a source of concern, its impact was not so strong in the students' lives. It is possible that, in some way, the students managed to develop effective coping strategies, which minimized the impairment, or that they overestimated the intensity of the symptom. According to the students, the most used techniques to cope with fatigue were the achievement of quality sleep (64.5%) and leisure (63.5%). Sleep results *in a feeling of re-established physical, psychic and intellectual energy*[15]. Hence, good sleep quality is important to minimize fatigue, as the students affirmed. Other strategies, such as aerobic activities and dancing, can be performed as leisure activities and be effective to manage fatigue and mental exhaustion[16].

Fatigue showed a positive correlation with the undergraduate course year, BMI and depression.

Teachers and students' reports confirmed greater fatigue in the fourth year, perhaps associated with the higher hour load of training periods (greater than in other course years) and with the stress related to the future employment status. Greater anxiety occurs at the start of the training period and, over time, the students develop coping strategies and adapt to the routine[13]. Fatigue related to future employment status is possibly due to selection processes, which are exhausting and demand study. The stress caused by the uncertainty of passing/failing these processes should also be considered.

Obese individuals tend to express greater fatigue than skinnier people. A study revealed a strong correlation between fatigue and obesity, mainly in the physical dimension of the symptom, when the depression variable was controlled[17].

Data found in this study, in which 42 (22%) students presented scores that indicate dysphoria, are in agreement with literature data. It should be highlighted that, although undergraduate course year, BMI, age and gender showed a statistical correlation with fatigue, only the fatigue-depression correlation was high (r= 0.612 and p=0.000), as shown in Table 4. The positive correlation found in this study between fatigue and depression converges with international and Brazilian studies[17]. Depression has been described associated with all dimensions of fatigue[18], as well as the high prevalence of reduced energy complaints (97%) and impact on the development of usual activities among depressed patients[9]. The fact that fatigue and depression were correlated does not clarify a relation of causality, and cohort studies could better investigate this relation.

Despite the negative correlations between fatigue and gender, it should be highlighted that the correlation was very low (-0.148) and that the number of men in the study is small (Table 1). Yet, plenty of literature exists on greater fatigue among women[2-3].

Like the gender analysis, a similar analysis is possible for age: the correlation was very low (r=-0.043), the mean and median age were very close (mean= 21.6, SD=2.8, median=21), indicating a homogeneous sample with small variation (16-39 years). Young people are going through a phase of self-knowledge regarding how to cope with new situations, including fatigue. Coping skills depend on experience and maturity[19]. In this manner, the older, the more mature the person will be and the stronger to deal with new events. In this case, one can say that mature adults would mention less fatigue due to more effective coping with the symptom. Confirming this hypothesis would demand a representative group of mature adults though, which was not possible in this research.

Opposed to expectations, no correlation was found between fatigue and extracurricular activity and between fatigue and whom the student lives with. The fact that 80% of the students lived with their parents may have impeded the expression of differences and, although about half of the students perform an extracurricular activity, this was not perceived as a cause of fatigue, perhaps due to the positive feedback these activities provide or due to the fact that who seeks extra activities in a way feels prepared to deal with them.

CONCLUSION

Moderate and severe fatigue was frequent among undergraduate nursing students. In 20% of cases, however, the intensity of the symptom was greater than its impact on activities of daily living. Fatigue and tiredness may have been considered synonymous, although they are not. Studies that refine the difference between tiredness and fatigue concepts and their impact in the undergraduate students' daily lives are needed. Fatigue showed a positive correlation with undergraduate course year, BMI and depressive symptoms, and a negative correlation with gender and age. Exhaustion due to the nursing course was the main cause of fatigue and adequate sleep and leisure activities the most important management strategies. Future studies are necessary to assess the relation between the causal factors of fatigue the students appointed and the efficacy of management strategies.

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