Rev Bras Cineantropom Hum

original article

DOI: http://dx.doi.org/10.5007/1980-0037.2017v19n1p96

Fatigue and symptoms of eating disorders in professional dancers

Fadiga e sintomas de transtornos alimentares em bailarinos profissionais

Yasmin Cristina Feitosa Rodrigues[1]
Nycolle Martins Reis[1]
Melissa de Carvalho Souza Vieira[1]
Zenite Machado[1]
Adriana Coutinho de Azevedo Guimarães[1]

Abstract – The aim of this study was to make a comparison between fatigue and eating disorders in professional dancers in Brazil. Overall, 108 Classical Ballet or Contemporary Dance dancers (28.6 ± 7.7 years) (49 women and 59 men) of companies from São Paulo, Rio de Janeiro, Minas Gerais and Rio Grande do Sul participated in this study. The following validated instruments were used (Eating Attitudes Test; Bulimic Inventory Test Edinburgh; Yoshitake Fatigue Questionnaire, general Information). Results: 16% of dancers have symptoms of anorexia; 25% in the symptomatic bulimia scale and 30% in the bulimia scale. Significant data were identified in the comparison of bulimia nervosa scales with fatigue domains; on the symptomatic scale with drowsiness and lack of attention at work domain (p = 0.015), on the severity scale with fatigue projections to the body domain (p = 0.014), and in both scales in the impaired concentration and attention domain (p = 0.003 and p = 0.047) and in the general fatigue score (p = 0.016). Dancers with higher scores for difficulty in concentration and attention are 1.558 (95% CI 1.113 to 2.179) times more likely to have symptoms of bulimia. This study showed that there is a relationship between fatigue and symptoms of bulimia.

Key words: Dancing; Eating disorders; Fatigue; Motor activity.

Resumo – *Objetivou-se realizar uma comparação entre fadiga e transtornos alimentares em bailarinos profissionais do Brasil. Participaram 108 bailarinos (49 mulheres e 59 homens), de Ballet Clássico ou Dança Contemporânea (28,6±7,7 anos), de companhias de São Paulo, Rio de Janeiro, Minas Gerais e Rio Grande do Sul. Utilizaram-se instrumentos validados (Teste de Atitudes Alimentares; Bulimic Inventory Test Edinburgh; Questionário de Fadiga de Yoshitake; Informações gerais). Notou-se que 16% dos bailarinos possuem sintomas de transtornos de anorexia; 25% na escala sintomática de bulimia e 30% na escala de gravidade da bulimia. Identificou-se dados significativos na comparação das escalas da bulimia nervosa com os domínios da fadiga; na escala sintomática com domínio sonolência e falta de atenção no trabalho (p=0,015), na escala de gravidade com domínio projeções da fadiga ao corpo (p=0,014), e em ambas as escalas no domínio dificuldade de concentração e atenção (p=0,003 e p=0,047) e no escore de fadiga geral (p=0,016). Bailarinos com maiores escores para dificuldade de concentração e atenção possuem 1,558 (IC95%=1,113–2,179) vezes mais chances de apresentarem sintomas de bulimia. Conclui-se neste estudo, que há relação entre fadiga e sintomas de bulimia nervosa.*

Palavras-chave: *Atividade motora; Dança; Fadiga; Transtornos alimentares.*

1 State University of Santa Catarina. Florianópolis, SC. Brazil.

Received: 18 July 2016
Accepted: 11 January 2017

INTRODUCTION

Professional dancers can be found in all types of dance, with a greater approach in Brazil in classical ballet and contemporary dance. Classical ballet has a rigid didactics, aiming at training with greater body requirement with emphasis on support, balance and ballet shoes[1]. In this modality, body leanness and aesthetics are valued, inducing the search for the ideal body[2], even without scientific records of the need to be skinny for the practice[1].

In contemporary dance, dancers also suffer pressure on their bodies. This modality incorporates new unconventional ballet movements or modern dance techniques. It demands sensorial stimuli and proprioception of dancers, but it also imposes high level of rehearsal and dedication as in classical ballet[3].

In both modalities, dancers are submitted to a routine of rehearsals, tours, elaboration of new choreographies, physical preparation, daily training and presentations that are extremely exhaustive[1,4]. Due to the high level of demand on their bodies, it is common to increase even more the training level, with the intention of burning more calories, harming their health by using inadequate and dangerous ways to achieve the body of dreams. Even with thin bodies, professional dancers tend to restrict their energy consumption[2], leading to eating disorders such as anorexia and bulimia nervosa[5,6].

Anorexia nervosa is characterized by food restriction, leading to body weight below the minimum expected, morbid fear of getting fat, body image distortion and use of drugs for weight loss; bulimia nervosa presents symptoms such as: recurrent episodes of binge eating, use of compensatory behaviors in order to prevent weight gain such as inducing vomiting after an episode of overeating and / or excessive physical activity[7].

Due to the intense training of classical ballet and contemporary dance, the appearance of trauma is frequent, with muscle fatigue being one of the main factors that lead to the onset of injuries[4,8]. Fatigue has been included in studies because it impairs the performance of different types of populations, such as athletes[9] and workers[10], causing impairment to quality of life[11]. Due to the great amount of physical exercise performed by professional dancers especially when spectacles approach, fatigue can cause impairment in the performance of dancers[4], for example decreased flexibility[12]. Eating disorders are also associated with the performance of dancers, inappropriate eating behaviors have been used to optimize performance, since in these dance modalities, which favor leanness, thin body is associated with higher athletic performance[5]. However, despite the influence that eating disorder and fatigue have on performance, there is a gap in literature relating these two variables in the same study.

Thus, it is necessary to investigate a possible relation between eating disorders and the level of fatigue in dancers, since these factors are common in the routine of dancers and scientific production on the subject is scarce. This study aims to compare fatigue and symptoms of eating disorders in

professional dancers in Brazil and will help to develop strategies that help choreographers, dancers and family members to avoid the development of fatigue and eating disorders.

METHODOLOGICAL PROCEDURES

This is a descriptive cross-sectional study based on secondary data from a research entitled of "Professional classical ballet and contemporary dance dancers: relationship between eating disorders and associated factors". The non-probabilistic sample was composed of 108 professional dancers, 49 women (29.4 ± 7.8 years) and 59 men (27.9 ± 7.6 years), of these 37 of classical ballet and 71 of contemporary dance, with mean age of 28.6 ± 7.7 years.

As inclusion criteria, dancers should be of classical ballet or contemporary dance modalities, of both sexes, over 18 years of age, paid to dance (being characterized in this research as professional dancers). In order to become a professional dancer, it is necessary to have an average professionalization time of 6.8 ± 5.7 years[4]. Dancers should belong to dance companies of the following states: Rio de Janeiro, São Paulo, Minas Gerais and Rio Grande do Sul. Exclusion criteria included illiterate dancers and those who were unable to complete the questionnaires adequately.

Dance companies were chosen for convenience, using the regions of Brazil with the greatest concentration of professional Companies, namely states of Rio de Janeiro, São Paulo, Minas Gerais and Rio Grande do Sul. Although there are no agencies that regulate dance companies In Brazil, pointing to numerical data, these states were selected because they are currently the poles of professional dance in Brazil. Thirty-six companies were invited, but only 12 (Sao Paulo - 4, Rio de Janeiro - 4, Minas Gerais - 2, Rio Grande do Sul - 2) accepted to participate, with percentage of 33.3%. Those who did not accept claimed lack of time.

For data collection, self-administered questionnaires about Eating Disorders Symptoms (Eating Attitudes Test; Bulimic Inventory Test Edinburgh); Yoshitake Fatigue Questionnaire; and general Information were used, described below:

Eating Disorders Symptoms: Two questionnaires, the Eating Attitude Test (EAT-26) and Bulimic Inventory Test Edinburgh (BITE) were used.

EAT-26[13] was, created to detect symptoms of Anorexia Nervosa, is a questionnaire composed of 26 questions proposed by Garner[13], and has validation for Brazilians[14]. Each question has a rating, with a score. For ordinal-scale responses Never, Almost Never, and Few, score zero points, at times, often and always scored 1, 2 and 3 points, respectively. Only for question 25, this sum occurs inversely. After the sum of questions, the scores of individuals will vary from 0 to 78 points; the cutoff point originally set by the authors is 21 points[13], in which individuals who scored 21 points or more are classified as having symptoms, which means that they have a risky eating behavior to develop eating disorders. Lower scores are classified with no symptoms.

BITE[15] is an instrument used to detect symptoms of Bulimia Nervosa. It is composed of 33 questions subdivided into 2 scales, which was translated into Portuguese by Cordás and Hochgraf[16]. According to the classification of the authors[16], in the first scale of the questionnaire, the degree of the bulimic symptoms is classified, summing up 30 points. Score greater than or equal to 20 points means compulsion and high probability of bulimia diagnosis, 15 to 19 points corresponds to a subclinical group, 10 to 14 points represents unusual eating pattern and 0 to 9 points is equivalent to the absence of behavior typical of bulimia. The second scale aims to indicate severity through the frequency of compulsive and purgative behaviors. Score less than or equal to 4 indicates level of severity without significance, from 5 to 9 points clinically significant level and a score greater than 10 indicate signs of high severity. For statistical analysis, in this study, they were later grouped and classified as: "symptomatic" in absence ("absence of typical behaviors of bulimia") and presence ("unusual eating pattern" + "subclinical group" + "compulsion and high probability of bulimia diagnosis); and "severity" in absence ("without significance") and presence ("clinically significant" + "evidence of high severity").

These two questionnaires are cited as the instruments most widely used for the evaluation of eating disorders[17], and have already been used in studies conducted with dancers[6,18].

Fatigue: evaluated by the Yoshitake Fatigue Questionnaire, validated for Portuguese by Metzner and Fischer[10]. The questionnaire consists of 30 multiple choice questions divided into three domains, with 10 questions each, according to the authors' classification[10]: The first one evaluates drowsiness and lack of disposition at work. The second is about the difficulty of concentration and attention. The third refers to fatigue projections to the body. The final score is calculated by summing up the scores of the three domains, ranging from 30 (lower fatigue) to 150 points (higher fatigue)[10]. This questionnaire was chosen because it evaluates fatigue in workers, as is the case of the study population.

General information: age, sex, schooling, marital status, functional occupation, presence of diseases, economic stratum, practice of physical activity in addition to dance and anthropometric variables (body mass and height to calculate body mass index kg / m^2) for weight status. Since the questionnaire was answered online, anthropometric variables were self referenced by participants themselves.

Body Mass Index (BMI) was calculated by means of body mass (in Kg) divided by height in meters elevated to the square using data self-referenced by dancers. The use of self-reported measures for the adult population is satisfactory and is considered a viable alternative in situations where it is not possible to directly obtain this information[19]. Dancers were classified by cutoff points established by WHO - World Health Organization[20], in which 18.5 kg / m^2 - low weight; between 18.5 and 24.9 kg / m^2 - ideal weight (eutrophic); between 25 and 29.9 kg / m^2 - overweight and above 30 kg / m^2 - obesity. For statistical analysis, in this study, low weight clas-

sification remained the same and ideal and overweight classifications were grouped into ideal weight, since only one person was overweight and no one was obese.

Economic stratum was assessed using the questionnaire of the Brazilian Economic Classification Criteria (CCEB), which is indicated by the Brazilian Association of Research Companies (ABEP)[21]. It has items related to the amount of comfort items, access to public services, and schooling of the family head. Summing up the points of the questions, participants were divided into A, B1, B2, C1, C2, D and E; to then be classified into: High (A), Medium (B1, B2, C1, C2), Low (D, E).

The study was approved by the Ethics Research Committee on Human Beings (CEPSH) of the State University of Santa Catarina (UDESC), protocol No. 1,152,774, on July 14, 2015, as prescribed in Resolution 466 of the National Health Council. Data collection began on August 2015 and ended on March 2016.

The contact with dance companies was initiated by phone calls, emails and social networks. The entire process was explained along with the referral of the questionnaire online link and with the free and informed consent, in which the dancer had the options "accept to participate" or "do not accept to participate". In addition, there was a place to fill with personal data in case the dancer chose to receive the return of the research.

Questionnaires were applied online through the Google Docs platform, which is a free web 2.0 tool that is easy to access and has wide visibility[22], thus allowing simultaneous collection in the selected states. According to Gonçalves[23], the application of online questionnaires has several advantages, among them: easy tabulation and data analysis, reduction of errors in response completion, control in the order of questions and the option of mandatory filling of the questionnaire.

In some cases, face-to-face collection was necessary at the request of dance company managers in order to respect the company's schedule, which was carried out at the company's rehearsal site, using the printed questionnaire. It is understood that the ideal would be just a form of collection, but it was decided to use both in order to reduce the loss of dance companies.

Data were treated by IBM-SPSS, version 20.0, using descriptive (mean, standard deviation, median, interquartile interval and percentage) and inferential statistics. For the association of categorical variables (sex, schooling, marital status, functional occupation, presence of disease, socioeconomic level, modality, state, practice of physical activity), Chi-Square and Fisher's Exact tests were used. Subsequently, normality was calculated using the Kolmogorov Smirnov test, finding normal data for category "difficulty of concentration and attention" and for the general fatigue score, and non-normal data for categories "drowsiness and lack of disposition at work" and "fatigue projections to the body". Thus, for the comparison of mean fatigue categories with eating disorders in parametric data, the T-test was used for independent samples, and the U-Mann Whitney test was used in non-parametric data.

Binary Logistic Regression was used to associate the symptoms of eating disorders with the fatigue domains, controlling them for the independent variables of sample characterization (modality, sex, age, schooling, marital status, functional occupation, presence of diseases, state, practice of PA and economic stratum). The Enter method was used to select variables with 5% significance level.

In this study, subjects were divided into three groups according to the symptoms of anorexia, bulimia and bulimia severity.

RESULTS

Table 1 shows significant results between sex and symptoms of anorexia nervosa (p = 0.003) and the symptomatic bulimia scale (p = 0.022), especially in females, which means that among dancers who had symptoms for eating disorders, the majority were female. Economic stratum was significantly associated with the symptomatic bulimia scale (p = 0.002), in which the high level presented higher values, which means that dancers who had symptoms of bulimia, the majority belonged to the high economic stratum.

In Table 2, no significant results were found.

Table 1. Association of the general characteristics of dancers stratified by eating disorders. Brazil, 2016.

	Total %	EAT (%)			BITE_SYM (%)			BITE_SEV (%)		
		Pres	Abs	p-value	Pres	Abs	p-value	Pres	Abs	p-value
Sex				0.003**			0.022*			0.485*
Male	44.9	11.8	51.1		25.9	51.2		50.0	42.7	
Female	55.1	88.2	48.9		74.1	48.8		50.0	57.3	
Schooling				0.871**			0.771**			0.849**
Elementary School	2.8	0.0	3.3		0.0	3.8		3.1	2.7	
High School	63.0	70.6	61.1		66.7	61.2		59.4	64.0	
Higher Education	34.3	29.4	35.6		33.3	35.0		37.5	33.3	
Marital Status				0.792*			0.874*			0.584*
With partner	38.9	41.2	37.8		37.0	38.8		34.4	40.0	
Without partner	61.1	58.8	62.2		63.0	61.2		65.6	60.0	
Functional Occupation				0.052**			0.179**			0.582**
Student	12.0	29.4	8.4		22.2	8.2		6.7	14.3	
Self employed	57.0	52.9	57.8		51.9	58.9		60.0	55.7	
Government Employee	12.0	0.0	14.5		14.8	11.0		16.7	10.0	
Private Company	19.0	17.6	19.3		11.1	21.9		16.7	20.0	
Presence of Disease				0.359**			1.000**			0.580**
Yes	3.9	0.0	4.8		3.7	4.1		6.7	2.8	
No	96.1	100	95.2		96.3	95.9		93.3	97.2	
Economic Stratum				0.144**			0.002**			0.430**
High	9.3	23.5	6.7		25.9	3.8		84.4	89.3	
Medium	88.0	76.5	90.0		70.4	93.8		9.4	9.3	
Low	2.8	0.0	3.3		3.7	2.5		6.2	1.3	

EAT - Eating Attitudes Test; BITE_SYM - Bulimic Inventory Test Edinburgh symptomatic scale; BITE_SEV - Bulimic Inventory Test Edinburgh

Table 2. Association of variables related to professional dancers stratified by eating disorders. Brazil, 2016.

	Total %	EAT			BITE_SYM			BITE_SEV		
		Pres. %	Abs. %	p-value	Pres. %	Abs. %	p-value	Pres. %	Abs. %	p-value
Modality				0.575**			0.519*			0.970*
Classic Ballet	31.7	25.5	33.1		26.9	33.8		32.3	31.9	
Contemporary Dance	68.3	75.6	66.2		73.1	66.2		67.7	68.1	
State				0.459**			0.539**			0.411**
São Paulo	52.0	40.0	54.7		42.7	55.8		58.6	50.0	
Rio de Janeiro	25.5	40.0	22.1		33.3	22.1		20.7	26.4	
Minas Gerais	5.9	6.7	5.8		4.2	6.5		10.3	4.2	
Rio Grande do Sul	16.7	13.3	17.4		20.8	15.6		10.3	19.4	
Practice of Physical Activity				0.364*			0.545*			0.080*
Yes	63.0	52.9	64.6		57.7	64.4		75.9	57.1	
No	37.0	47.1	35.4		42.3	35.6		24.1	42.9	

EAT - Food Attitudes Test; BITE_SYM - Bulimic Inventory Test Edinburgh symptomatic scale; BITE_SEV - Bulimic Inventory Test Edinburgh severity scale; Pres. - presence of symptoms; Abs. - absence of symptoms. % = Relative frequency. * Chi-square ** Fisher's exact

Dancers presented mean BMI of 21.17 ± 2.04. Most presented ideal weight. When associated with symptoms of anorexia nervosa, 17.6% of low-weight dancers presented symptoms and 9.0% presented no symptoms, while among ideal weight dancers, 82.4% had symptoms and 91.0% presented no symptoms (p-value 0.378). Associating BMI with the symptomatic bulimia severity scale among low-weight dancers, 7.4% had symptoms and 11.4% had no symptoms, among normal weight, 92.6% had symptoms and 88.6% had no symptoms (p-value 0.725). When associated with the bulimia severity scale among low-weight dancers, 9.4% presented symptoms and 10.8% presented no symptoms, while among normal weight, 90.6% had symptoms and 89.2% had no symptoms (p-value 1.000) (data not shown).

In this study, it was possible to observe that 15.8% of dancers have symptoms of anorexia; 25.2% reported symptoms of disorders on the symptomatic bulimia scale and 29.9% on the bulimia severity scale (data not shown).

Regarding fatigue, 69.00 ± 13.61 dancers, on average, presented general fatigue, 25.73 ± 4.80 presented difficulty of concentration and attention, 20.63 ± 5.41 presented fatigue projections to the body and 22.64 ± 5.61 presented drowsiness and lack of disposition at work (data not shown).

Table 3 shows significant data for the comparison of fatigue level in the drowsiness and lack of attention in the work with the symptomatic bulimia scale (p = 0.015), and in the fatigue projections to the body compared to the bulimia severity scale domains (p = 0.014). Significant values were found comparing to the two bulimia scales, both for the difficulty of concentration and attention domain (p = 0.003 and p = 0.047), respectively, symptoms and severity, as for the general fatigue score (p = 0.016) for both scales, which means that fatigue may be related to symptoms of bulimia nervosa, but in this study, it was not possible to identify if fatigue is related to disorders or if disorders are related to fatigue. There were no significant results for anorexia.

In the simple model, drowsiness fatigue, difficulty fatigue and general fatigue were associated with the presence of symptoms of bulimia and fatigue projections and general fatigue to bulimia on the severity scale. When the model

was adjusted for all variables of the general sample characterization, only domain difficulty fatigue (difficulty of concentration and attention) remained associated. It was observed that dancers with higher scores in this domain were 1.558 (95% CI = 1.113-2.179) times more likely to present symptoms of bulimia regardless of dance modality, sex, age, schooling, marital status, functional occupation, presence of disease, state, practice of PA and economic stratum (Table 4).

Table 3. Comparison between fatigue and eating disorders in professional dancers. Brazil, 2016.

	EAT			BITE_SYM			BITE_SEV		
Fatigue	Pres.	Abs.	p	Pres.	Abs.	p	Pres.	Abs.	p
	Md(DIQ)	Md(DIQ)		Md(DIQ)	Md(DIQ)		Md(DIQ)	Md(DIQ)	
Drowsiness			0.286*			0.015*			0.114*
	26.0(9)	22.0(6)		25.5(5)	22.0(7)		24.0(6)	22.0(8)	
							M (sd)	M (sd)	
Projections			0.727*			0.337*			0.014#
	22.0(10)	20.0(7)		20.5(9)	20.0(8)		22.6(6)	19.8(5)	
	M (sd)	M (sd)		M (sd)	M (sd)		M (sd)	M (sd)	
Difficulty			0.883#			0.003#			0.047#
	25.5(5)	25.7(5)		28.1(4)	24.9(5)		27.2(5)	25.1(4)	
General			0.621#			0.016#			0.016#
	70.5(16)	68.7(13)		74.5(12)	67.2(13)		73.9(14)	66.9(13)	

EAT - Eating Attitudes Test, BITE_SYM - Bulimic Inventory Test Edinburgh symptomatic scale; BITE_SEV - Bulimic Inventory Test Edinburgh severity scale; Pres. - presence of symptoms; Abs. - absence of symptoms; Md - median; DIQ - interquartile range difference; M - mean; sd - standard deviation; P - p-value; Drowsiness fatigue - drowsiness and lack of disposition at work; Projection fatigue - projections of fatigue to the body; Difficulty fatigue - difficulty of concentration and attention; General fatigue - referring to total instrument fatigue (sum of the three scales).* U-Mann Whitney; # Test - t.

Table 4. Association of symptoms of eating disorders with fatigue domains.

	EAT			
	OR CRUDE		OR ADJUSTED	
Fatigue	(95% CI)	p	(95% CI)	p
Drowsiness	1.037(0.945;1.138)	0.446	0.736(0.538;1.007)	0.055
Difficulty	0.992(0.887;1.108)	0.882	0.966(0.723;1.291)	0.815
Projections	1.030(0.936;1.133)	0.550	1.388(0.974;1.979)	0.070
General	1.010(0.972;1.050)	0.617	-	-
	BITE_SYM			
	OR CRUDE		OR ADJUSTED	
Fatigue	(95% CI)	p	(95% CI)	p
Drowsiness	1.096(1.011;1.189)	0.027	1.109(0.775;1.588)	0.570
Difficulty	1.170(1.048;1.307)	0.005	1.558(1.113;2.179)	0.010
Projections	1.046(0.966;1.134)	0.269	-	-
General	1.042(1.007;1.078)	0.019	0.903(0.741;1.010)	0.313
	BITE_SEV			
	OR CRUDE		OR ADJUSTED	
Fatigue	(95% CI)	p	(95% CI)	p
Drowsiness	1.070(0.991;1.154)	0.883	-	-
Difficulty	1.099(0.999;1.208)	0.051	-	-
Projections	1.100(1.016;1.191)	0.019	1.052(0.853;1.297)	0.638
General	1.039(1.006;1.074)	0.020	1.044(0.952;1.146)	0.361

EAT - Eating Attitude Test, BITE_SYM - Bulimic Inventory Test Edinburgh symptomatic scale; BITE_SEV - Bulimic Inventory Test Edinburgh severity scale; OR = Odds ratio; Drowsiness fatigue - drowsiness and lack of disposition at work; Projection fatigue - projections of fatigue to the body; Difficulty fatigue - difficulty of concentration and attention; General fatigue - referring to total instrument fatigue (sum of the three domains). 95% CI - confidence interval; P-value.* Data were adjusted for all sample characterization variables: modality, sex, age, schooling, marital status, functional occupation, presence of disease, state, practice of PA and economic stratum.

DISCUSSION

The present study aimed to analyze the comparison between fatigue and eating disorders in professional dancers in Brazil. There were significant results in the comparison between fatigue and eating disorders symptoms in the following domains: drowsiness, lack of attention at work, fatigue projections to the body, difficulty of concentration and attention and general fatigue, indicating that eating disorders symptoms can lead to worse results in these variables.

It was verified that 15.89% of dancers presented symptoms of anorexia, 25.23% symptoms of bulimia on the symptomatic scale and 29.91% symptoms of bulimia on the severity scale. It is noteworthy that the occurrence of eating disorders among females was higher. Since the presence of eating disorders symptoms has been associated with body image dissatisfaction, the higher incidence of these symptoms in females is due to the women's concern with the body, being more dissatisfied[18].

Likewise, there was a greater occurrence of eating disorders symptoms in dancers with higher economic stratum, confirming a study that identified that eating disorders symptoms have been associated with higher strata of the society[24]. It was verified that access to different information and media vehicles (television; Internet) provided by higher economic level greatly influences the standards of beauty and body[25], in which the individual is surrounded by such information, becoming susceptible to achieve the ideal body at any cost.

The results of this study are concerning, because eating disorders can damage the health of dancers[2] and reduce their performance. However, there are controversies, because reports have shown that even during the occurrence of fatigue, there is no reduction in the performance of dancers[27]. Similar results are also found in high-performance athletes, showing that they present greater resistance to high-intensity exercises[9]. However, fatigue is a valence difficult to evaluate and can be confused with tiredness. For this reason, the use of direct measures to evaluate fatigue is now known as the gold standard[28]. However, in this study, fatigue was evaluated through indirect measurements, since making direct evaluations at national level is not feasible. Even so, dancers perform intermittent training that ends up requiring higher VO_2 max, which can lead to fatigue[27]. When fatigue is related to training in dance, it is hypothesized that it may be related to the training period, since there is intensification in pre-performance periods and competitions, compromising the physical and mental preparation of dancers[4,8].

Comparing eating disorders symptoms and fatigue, significant results in fatigue in the drowsiness and lack of disposition at work domains were found, showing that having problems with sleep can increase the level of fatigue[10], which could be justified by the fact that dancers with symptoms of eating disorders exercise beyond the intense hours of training[29], because in addition to the interest in the perfect technique, they also aim to have leaner bodies. Thus, with a focus on performance, there is a significant

reduction in sleep time because they spend more hours of their day on training than on rest, thus increasing levels of fatigue and possibly physical discomfort in their professional activities[4,30].

In addition, it was possible to identify that dancers with higher fatigue levels in difficulty of concentration and attention domains are more likely to present symptoms of eating disorders, specifically bulimia. It is known that bulimia is characterized by episodes of high food intake and excessive concern with body, and individuals make use of extreme means to stop weight gain, such as excessive exercise[7]. It is possible that individuals with higher levels of fatigue due to the excessive training characteristic of professional dancers are more likely to present the disorder, since they end up having this greater concern with body and feel more need to practice physical exercises.

With a tired, aching, and malnourished body, the dancer's health becomes impaired[2], making it difficult to focus attention on rehearsals, impairing his or her performance[26]. Thus, it seems that dancers are a category with a greater tendency to have symptoms of eating disorders and a daily fatigue routine. However, this study did not conclude whether fatigue leads to the development of eating disorders or the inverse, suggesting the performance of new studies to verify the relationship between these two variables.

This study has some limitations: the reduced number of dance companies due to lack of interest in participating in the study, the study design, which does not allow establishing a cause-effect relationship among the variables investigated and data collection in two ways (online and in person).

However, it is necessary to highlight the advantages of the present study, such as the fact that it investigated only professional dancers and addressed a topic still not widely investigated in literature. The results obtained by this study can help in the knowledge and awareness of dancers, choreographers and / or directors of dance companies, regarding the importance of maintaining healthy body both to minimize factors detrimental to the performance of dancers, such as fatigue, and to maintain their general health.

CONCLUSION

When comparing fatigue with the presence of eating disorders symptoms, there was a relationship between fatigue and symptoms of bulimia nervosa. It was found that higher fatigue scores (difficulty of concentration and attention) were associated with higher likelihood of having symptoms of bulimia.

A work should be conducted to eradicate the culture that the dancer must necessary have a lean body. In classical ballet, the pressure for the ideal body is much greater than in contemporary dance, and this pressure coupled with poor diet can damage the health of dancers, leaving their bodies weaker and less resistant to fatigue, since malnourished and fatigued body is more prone to injuries.

REFERENCES

1. Simas JPN, Guimarães ACDA. Ballet clássico e Transtornos Alimentares. Rev Educ Fís/UEM 2002; 13(2):119-26.
2. Moura UISD, Mendes LR, Silva IPDO, Ângelo RDCDO, Schwingel PA. Consumo alimentar, perfil antropométrico e imagem corporal de bailarinas clássicas do Vale do São Francisco. Rev Bras Nutr Esportiva 2015; 9(51):237-46.
3. Dantas M. De que são feitos os dançarinos de "aquilo..." criação coreográfica e formação de intérpretes em dança contemporânea. Mov 2005; 11(2):31-57.
4. Dore BF, Guerra RO. Sintomatologia dolorosa e fatores associados em bailarinos profissionais. Rev Bras Med Esporte 2007;13(2):77-80.
5. Perini TA, Vieira RS, Vigário OS, Oliveira GL, Ornellas JS, Oliveira FP. Transtorno do comportamento alimentar em atletas de elite de nado sincronizado. Rev Bras Med Esporte 2009; 15(1):54-7.
6. Ribeiro LG, Da Veiga GV. Imagem Corporal e Comportamentos de Risco para Transtornos Alimentares em Bailarinos Profissionais. Rev Bras Med Esporte 2010; 16(2):99-102.
7. Manual Diagnótico e Estátistico de Transtornos Mentais/DSM – 5. American Psychiatric Association. Artmed, 2014; Disponível em: <http://c026204.cdn.sapo.io/1/c026204/cld-file/1426522730/6d77c9965e17b15/b37dfc58aad8cd477904b9bb-2ba8a75b/obaudoeducador/2015/DSM%20V.pdf> [2016 ago 25].
8. Guimarães ACA, Simas JPN. Lesões no ballet clássico. Rev Educ Fís/UEM 2001; 12(2):89-96.
9. Spigolon LMP, Borin JP, Leite GDS, Padovani RP, Padovani CR. Potencia Anaeróbia em atletas de futebol de campo: diferenças entre categorias. Colec Pesqui Educ Fís 2007; 6(1):421-8.
10. Metzner RJ, Fischer FM. Fadiga e capacidade para o trabalho em turnos fixos de doze horas. Rev Saúde Publica 2001; 35(6):548-53.
11. Mota DDCF, Cruz DALM, Pimenta CAM. Fadiga: uma análise do conceito. Acta Paul Enferm 2005; 8(3):285-93.
12. Ali LR, Navarro F. A relação da hipermobilidade músculo-articular de bailarinos e o risco de lesões. Rev Bras Ciên Saúde 2004; 2(4):29-33.
13. Garner DM, Olmsted MP, Bohr Y, Garfinkel PE. The eating attitudes test: Psychometric features and clinical correlates. Psychol Med 1982; 12(4):871-8.
14. Nunes MA, Camey S, Olinto MTA, Mari JJ. The validity and 4-year test-retest reliability of the Brazilian version of the Eating Attitudes Test-26. Braz J Med Biol Res 2005; 38(11):1655-62.
15. Cooper PJ, Taylor MJ, Cooper Z, Fairburn CG. The development and validation of Body Shape Questionnarie. Int J Eat Disord 1987; 6(4):485-94.
16. Cordás TA, Hochgraf BP. O "BITE": instrumento para avaliação da bulimia nervosa-versão para o português. J Bras Psiquiatr 1993; 3(42):141-4.
17. Freitas S, Gorenstein C, Appolinario JC. Instrumentos para a avaliação dos transtornos alimentares. Rev Bras Psiquiatr 2002; 24(Suppl 3):34-8.
18. Reis NMR, Machado Z, Pelegrini A, Boing L, Monte FCSG, Simas JPN, Guimarães A. Imagem corporal, estado nutricional e sintomas de transtornos alimentares em bailarinos. Rev Bras Ativ Fís Saúde 2013;18(6):763-81.
19. Coqueiro RDS, Borges LJ, Araújo VC, Pelegrini A, Barbosa AR. Medidas autoreferidas são válidas para avaliação do estado nutricional. Rev Bras de Cineantropom Desempenho Hum 2009;11(1):113-9.
20. World Health Organization/WHO. The International Classification of adult underweight, overweight and obesity according to BMI. 2004; Disponível em: <http://apps.who.int/bmi/index.jsp?introPage=intro_3.html> [2015 jun 1].
21. Associação Brasileira de Empresas de Pesquisa/ABEP. Critério de Classificação Econômica Brasil. Portal ABEP,2015; Disponível em: <http://www.abep.org/criterio-brasil> [2015 jun 15].

22. Klemann MN, Rapkiewicz CE. Pesquisa-ação para inclusão digital de professores e alunos: um projeto piloto usando Google Docs. Renote 2011; 9(2):1-10.
23. Gonçalves DIF. Pesquisas de marketing pela internet: as percepções sob a ótica dos entrevistados. Rev Adm Mackenzie 2009; 9(7):70-88.
24. Borges NJBG, Sicchieri JMF, Ribeiro RPP, Marchini JS, Dos Santos JE. Transtornos Alimentares – Quadro Clínico. Med (Ribeirão Preto) 2006; 39(3): 340-8.
25. Dieling S, Martin Van Der Esch M, Janssen TWJ. Knee Joint Proprioception in Ballet Dancers and Non-dancers. J Dance Med Sci 2014; 18(4):143-8.
26. Fortes LS, Paes ST, Amaral ACS, Ferreira MEC. Comportamento Alimentar Inadequado e insatisfação corporal em jovens nadadores em função de variáveis sociodemográficas. Psicol teor prat 2012; 14(3):123-33.
27. Rodrigues-Krause J, Krause M, Cunha GDS, Perin D, Martins JB, Alberton CL, Schaun MI, De Bittencourt Junior PVH, Reischak-Oliveira A. Ballet dancers cardiorespiratory, oxidative and muscle damage responses to classes and rehearsals. Eur J Sport Sci 2014; 14(3):199-208.
28. Amaducci CDM, Mota DDFDC, Pimenta CADM. Fatigue among nursing undergraduate students. Rev Esc Eferm USP 2010; 44(4):1047-53.
29. Fração VB, Vaz MA, Ragasson CAP, Müller JP. Efeito de treinamento na aptidão física da bailarina clássica. Mov 1999; 5(11):3-15.
30. Assunção SSM, Cordás TA, De Araújo LASB. Atividade física de transtornos alimentares. Rev Psiquiatr 2002; 29(1):4-13.

CORRESPONDING AUTHOR

Nycolle Martins Reis
Endereço: Rua Tereza Lopes, 734. Campeche. Florianópolis-SC – Brasil
CEP: 88066-065.
E-mail: nycolle_mr@hotmail.com