Original Article

Dietary habits and orthorexic behaviours of dancing school female students

MATEUSZ GRAJEK¹, JOANNA KOBZA¹, KAROLINA SOBCZYK³, ELIZA DZIAŁACH¹, AGNIESZKA BIAŁEK-DRATWA³, MICHAŁ GÓRSKI³, KRZYSZTOF SAS-NOWOSIELSKI⁴

^{1,2,4}Department of Public Health, Department of Public Health Policy, Faculty of Health Sciences in Bytom, Medical University of Silesia in Katowice

^{3,5}Department of Health Economics and Health Management, Faculty of Health Sciences in Bytom, Medical University of Silesia in Katowice

⁶Department of Human Nutrition, Department of Dietetics, Faculty of Health Sciences in Bytom, Medical University of Silesia in Katowice

⁷Department of Pedagogy, Psychology and Sociology, Department of Humanistic Foundations of Physical Culture, The Jerzy Kukuczka Academy of Physical Education in Katowice
POLAND

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Abstract

Introduction. Previous studies have shown that inappropriate human nutrition is the common cause of eating disorders (especially orthorexia nervosa). the aim of this study was to investigate dietary habits and the risk of orthorexic behaviours among dancing school female students. **Material and methods.** The investigated group consisted of 400 female students aged 10-18 years who attended dancing schools. The dietary habits reported in the researched group were evaluated by collecting the data in a form of authors' questionnaire which were subsequently elaborated by using brief diet quality index (DQI). When it comes to assessing the risk of orthorexic behaviours (ORTO-15). **Results.** While using the DQI scale, it was stated that 45% of all subjects reported good, 43% – satisfactory, and 12% had bad dietary habits. Good dietary habits were observed among 63% of the youngest girls, 33% of the oldest female students and 30% of the thirteen-, fourteen- and fifteen-year-olds. Bad dietary habits were observed among 24% of female students representing the 13-15 age group, 18% aged 16-18, and by none of the respondents aged 10-12 years. The genuine risk of eating disorder was diagnosed among 59% of research subjects. There were students who assessed their dietary habits as good (65%), and some who considered themselves as 'too obese' (73%). Statistical inference has shown the relationship between the positive outcome of the ORTO-15 questionnaire and participants' incorrect perception of their own body image ($p<0,05$). **Conclusions.** The dancing school female students who declared increased physical activity, are marked by better dietary habits when compared to respondents with lower level of activity. The best dietary habits were reported by girls at the initial stage of learning at dancing schools. There is an actual risk of progressing eating disorders among dancing school female students.

Key words: eating disorders, dancers, sport, health promotion

Introduction

Body mass and body composition should be consciously regulated depending on contestants' individual ontogenetic features (Nowogrodzka & Piasecki 2012, Żulawa & Pilch 2012). The constant pursuit of perfection, which is an outcome of high level competition, requires young contestants to regularly control their body weight, which frequently results in undesired dietary behaviours; when combined with an intensive physical exertion, a risk of a muscle damage and adverse changes in metabolic processes may occur (Strzelecki et al. 2007, Patel 2005, Holly & Harvey 2018). This is especially important for professional dancers (Repnikova & Kareva 2018). Dancing technique is a complicated motion activity, which requires high capability in muscle tension differentiation in time, optimal load distribution in different movement chains, economic consumption of muscle energy, and proper diet (Komerowski et al. 2016, Grigore et al. 2019). Interestingly, too limited amount of nutrients included in a daylong diet may result in a decline in human body capacity and consequently cause an overall decrease in the efficiency of the training session (Dittfeld 2013). It has been observed that young athletes deliberately interfere with their bodies during puberty when practising some sports disciplines; this is especially true for females who practice disciplines that require them to have an impeccable figure (Peric et al. 2016). They strive to maintain their physical appearance according to the applicable standards. Girls who want to keep their body weight at the lowest possible level follow various diets, which are usually non-physiological (Chinault 2019).

Previous studies have shown that inappropriate human nutrition is the common cause of eating disorders (especially orthorexia nervosa) (Grajek et al. 2018, Grajek et al. 2019). The orthorexia risk index in studies ranges from 6% to 90% depending on the studied research group. Part of this is also because the diagnostic criteria are not universal (Dunn et al. 2017, Dunn & Bartman 2017). The abovementioned disorders are observed among half of the female contestants who reported practicing sports that required a highly slender figure. An intensive physical exertion undertaken by girls, especially prior to puberty, along with a lower percentage of adipose tissue, reduction in body mass, and stress related to sports rivalry are considered to be the main factors of the female athlete triad syndrome (Chinault 2019). A relatively large number of girls who practice sport, in particular artistic disciplines (e.g., classical dance or ballet), are frequently subject to the risk of one or all three interrelated disorders (Kareva 2013). This may involve up to 62% of female athletes performing aesthetic sports Peric et al. 2016, Håman et al. 2015). These irregularities may be attributed to psychological, sociological, or physiological factors (Grajek et al. 2012). Female athletes, who experience considerable social pressure or are highly motivated to achieve success, may be particularly affected by these disorders (Grajek et al. 2013). Consequently, malnutrition and negative energy balance lead to hypoestrogenism (impairment of female reproductive hormone balance), which is characterised by abnormal uterine bleeding. The cessation of regular menstruation implies an irreversible bone density deficit. These changes are accompanied by the development of psychosomatic pathologies that are difficult to treat (Strzelecki et al. 2007). In recent years, a fairly large amount of attention is being drawn to the problem of eating disorders diagnosed in various social groups; therefore, it is worth investigating how dietary habits and self-perceived body image are represented among female ballet students (Chalcarz et al. 2014).

Therefore, the aim of this study was to investigate dietary habits and the risk of orthorexic behaviours among dancing school female students.

Material and methods

The investigated group consisted of 400 female students (10–18 years old) who attended dancing schools in the Silesian Voivodeship. The dietary habits of the researched group were evaluated by collecting the data in the form of authors' questionnaire and subsequently elaborated on using a brief diet quality index (DQI) (Table I). To assess the risk of orthorexic behaviours, an ORTO-15 questionnaire was used; the questionnaire was applied twice to validate the obtained results.

Table I Brief Diet Quality Index (DQI).

Diet Quality Index (DQI):				
Number of meals	5 meals – 5 pts	4 meals – 4 pts	3 meals – 2 pts	2 meals – 0 pts
Breakfast	Yes – 1 pts No – 0 pts Sometimes – 1 pts			
Lunch				
Dinner				
Dessert				
Supper				
Fruit and vegetables	500g and 350g 5 pts	250g and 150g 4 pts	Vegetables only 2 pts	Fruit only 2 pts
Fish	A few times per week 5 pts	Once per week 4 pts	Rarely 1 pts	Never 0 pts
Dairy	A few times per day 5 pts	Once per day 4 pts	Once per week 2 pts	Very rarely 0 pts
Sweets	Yes – 0 pts Occasionally – 2 pts No – 5 pts			
Maximum 10*5= 50 points				
Level of proper nutrition (%) = (sum of points scored / 50 points)*100%				
Level of proper nutrition:				
bad (0 – 49%)				
satisfactory 50 –70%				
good > 70%				

The collected data were statistically analysed. To do so, the Statistica 13.0 package was applied. An intergroup comparison was conducted using variance analysis along with post-hoc tests (Scheffé test). When it comes to failed research assumptions, tests' nonparametrical equivalents were used instead (e.g., Mann–Whitney U test, ANOVA Kruskal–Wallis test, and chi-square test) including the multiple comparison of the mean value for ranks in every testing and corrections for the conducted tests. The direction and strength of correlation between two quantitative variables were estimated using the regression equation and Pearson correlation coefficient. Kappa test was used to estimate the data reliability collected in the ORTO-15 questionnaire. The degree of probability *p* reached 0.05.

The average age of students was 13 ± 2.5 years. The largest group consisted of the youngest ballet students and accounted for 45% (10–12 years old). Every third subject belonged to the 13–14-year-old age bracket. Nearly all students were from the city (91%); the majority of respondents lived at home (81%). Every fifth student was a resident of a boarding school (16%) or other form of accommodation (3%). The average number of hours of physical activity reached 17 ± 3 h per week. High physical activity (i.e., over 15 h per week) was reported by the majority of subjects (72%). Some girls practiced even 20 h per week.

Results

Using the DQI scale, it was determined that 45% of all subjects reported good, 43% had satisfactory, and 12% reported bad dietary habits. Good dietary habits were observed among 63% of the youngest girls, 33% of the oldest female students, and 30% of the 13, 14, and 15-year-olds. Bad dietary habits were reported by 24% of female students from the 13–15 age group, by 18% of 16–18-year-old students, and by none of the 10–12-year-old respondents. The data analysis showed that the youngest female students had the best dietary habits. Differences in the obtained results were statistically significant ($p < 0.05$).

There were statistically significant differences ($p < 0.05$) in the results on dietary habits of female students depending on the number of training sessions. Good dietary habits were observed among 50% of girls who reported considerable physical activity (a minimum of 15 h per week) and among 33% of girls who reported moderate physical activity (6–14 h per week). Every third girl who practiced 6–14 h per week and 4% of students training a minimum of 15 h had bad dietary habits. The analysis of collected results showed that girls with higher physical activity had better dietary habits than their peers. The research group did not report the amount of training sessions shorter than 6 h per week (Fig. 1).

Fig. 1. The overall evaluation of dietary habits (from bad to good) and the level of physical activity (PA = physical activity).

Students' dietary habits were also analysed with respect to their educational experience. Good habits were observed among 58% of girls with the maximum of 2 years of educational experience. A total of 36% of students who attended dancing school for the longest period of time had bad dietary habits. This included 10% with the shortest educational experience, 8% who completed 6–8 years of learning, and 5% who studied for 3–5 years. It was determined that the girls who were at the initial stage of learning at dancing schools had the best dietary habits. Differences in the obtained results were statistically significant ($p < 0.05$) (Fig. 2).

Fig. 2. The overall evaluation of dietary habits (from bad to good) and participants' educational experience (yrs).

The distribution of responses depending on the type of school shows that the majority of girls attending

state schools had better dietary habits than students who attended private schools (52% vs. 34%, respectively). Differences in the obtained results were statistically significant ($p < 0.05$).

The analysis of results obtained using DQI, which included students' self-perception of their own body, showed that all subjects who considered themselves to be 'too thin' had good dietary habits. While 47% of girls who admitted to be 'just right' and 29% of students who claimed to be 'too obese' had good dietary habits. Bad dietary habits were observed among 19% of students who considered themselves to be 'too obese' and among 10% of students who claimed to be 'just right'. Statistical analysis shows that differences in the obtained results were statistically significant ($p < 0.05$).

When analysing repetitiveness of the provided responses, 15 questions were included in the ORTO-15 questionnaire. Each question was answered by providing responses on a 4-point scale. It was possible to recognise orthorexic behaviour when the total number of points scored exceeded 20. The obtained results suggest that six questions (1, 2, 4, 5, 6, 10) were characterised by a very good repetitiveness of answers given (Kappa = 0.91–1.00), while the repetitiveness in the remaining nine questions was good (Kappa = 0.51–0.70).

The genuine risk of eating disorders was observed among 59% of subjects. This included students with good dietary habits (65%) and 73% of students who considered themselves to be 'too obese'. Statistical inference showed a relationship between the positive result obtained in the ORTO-15 questionnaire and participants' incorrect perception of their own body ($p < 0.05$).

Discussion

Sport dance is a discipline that requires an impeccable physical appearance and appropriate body mass. Attempts to manipulate one's eating preferences without help from a specialist, particularly during puberty, may lead to unhealthy dietary habits and result in eating disorders. Many researchers claim that female dancers represent a high-risk group of orthorexia nervosa, which is characterised by distortion in perception of one's own body [8–10]. This study confirmed that the risk of eating disorders occurred more often among girls with misperception of their own body. The frequency of bad dietary habits was also correlated with the educational experience at ballet school. The obtained data confirm prior results by Witkoś (2017), Civil (2019), Jáuregui-Lobera (2016), Ołpińska-Lischka (2017), Peric (2016), Chalcarz (2014), Aksoydan and Camci (2019).

Witkoś et al. (2017) conducted analysis of dietary habits and food preferences among 243 young women who practiced dancing. The mean age was 22.1 years. The research was conducted in the form of authors' survey, which focused on consumed meals, use of weight-reducing diets, and satisfaction with the current body weight. The average body mass index (BMI) value was 20.7 kg/m²; BMI of nearly 20% was below 18.5 kg/m². Regarding the daily intake of meals reported by female dancers, 42.4% of respondents consumed 3 meals; 27.6% had 4 meals; 18.9% of respondents had 5 meals, and 11.1% had 2 meals. The food products consumed by dancers 7 times per week included bread (64% of respondents), dairy products (36%), fruits, vegetables and salads (43%), sweets, chocolate, and desserts (23%). The majority of female dancers ate red meat and fish no more than once a week. Moreover, 79% of participants consumed fast food once a week. Regarding the estimated satisfaction with respondents' body mass, approximately 58% of dancers were not particularly satisfied with their current body mass. Over 60% of participants admitted that they are still using or used weight-reducing diets before. Alarming, some people considered starvation diets or laxatives as appropriate methods for reducing their body mass. Of note, 95% of female dancers demonstrated the need to reduce their body mass. All respondents were familiar with the concept of anorexia and bulimia and were aware of the consequences caused by malnutrition resulting from the abovementioned disorders. Despite absence of some characteristic dietary habits commonly associated with sports disciplines and dancing in particular, the desire to reduce body mass by the majority of subjects may still seem alarming.

Civil et al. (2019) studied 20 female dancers who were 17–19 years old. The average BMI value for the studied group was 19.0 kg/m². The research included factors such as anthropometric measurements, dietary behaviours, and the risk of RED-S. The food intake was assessed using a food journal and the 24-h interview method. In addition, Three Factor Eating Questionnaire (TFEQ-18) was used to estimate eating behaviours. It was determined that uncontrolled eating was the most commonplace behaviour among approximately 50% of people. Moreover, 7 participants reported using a diet that limited certain products or caloric value of the diet used. The researched group's intake of energy and proteins, fats and carbohydrates during weekdays was similar to the intake reported on weekends. The average daily caloric deficit per day was approximately 308 kcal. In addition, there was an observable tendency for negative energy balance in the researched group of professional female ballet dancers. As a result, respondents may be prone to RED-S and related consequences.

Jáuregui-Libera et al. (2016) conducted research on dietary habits, body image, and risk of eating disorders of 77 dancers (20 males and 57 females). The mean age of respondents was slightly above 21 years. The research involved analysis of factors related to mass and body image – BMI, frequency of body weight measurements, evaluation of participants' figure and body shape, diets used, and self-perceived physical activity. The following questionnaires were also applied: Eating Attitudes Test-40 (EAT-40), Eating Disorders Inventory-3 (EDI-3), the Spanish version of Body Image Quality of Life Inventory (BIQLI-SP), Body Appreciation Scale (BAS), Self-esteem Scale (SES), and General Health Questionnaire-28 (GHQ-28). Slightly more than 93% of

respondents had normal body mass index; whereas the average BMI value of subjects was 21.01 kg/m². Nonetheless, over 42% of people assessed their current body mass as abnormal, i.e., either underweight or overweight. This included approximately 34% of respondents with normal body mass who perceived themselves as overweight; the risk of eating disorders was assessed using the EAT-40 (cut-off point ≥ 21) questionnaire among over 18% of respondents. However, the spread of eating disorders in the researched group is not definite owing to the value of the EAT-40 cut-off point.

A significant point observed prior to eating disorders was the anorexia readiness syndrome. Ołpińska-Lisichka's (2017) research on anorexic behaviours studied 156 female dancers from Poland and Germany. The research was conducted in a form of an online questionnaire distributed among 90 dancers from Germany and 56 dancers from Poland, who performed various types of dance. The research included B. Ziolkowska's Eating Attitudes Questionnaire consisting of 20 consecutive questions that could be answered Yes or No; dancers' body image was assessed by the Body Esteem Scale by S. Franzoi and S. Shields. The scale comprised 35 items related to body parts and their functions. Among the studied group of females (who were not older than 25 years of age), approximately 67% of dancers from Germany and 45% of dancers from Poland used fasting diets or reduced supply of food. The same tendency observed among dancers older than 25 years of age was relatively smaller (33% of Polish dancers and 54% of German dancers). Regarding the physical attractiveness assessment, the overall self-perception of respondents' own body was similar. Based on Likert's five-item scale referring to participants' satisfaction with their own body, the following dominant statements were observed: 'I have no particular feelings' or 'I have rather positive feelings'. The abovementioned tools were used to assess the risk of anorexia readiness syndrome. The obtained results confirm that the dance environment is a high-risk environment for developing eating disorders.

Peric et al. (2016) studied eating disorders and psychoactive substance use and abuse (including analgesics) among 21 professional female ballet dancers. The respondents were 17–32 years old. The minimal span of training sessions or performances was 25–30 h per week, and the participants dealt with ballet for at least 8 years. Eating disorders were evaluated using the Brief Eating Disorder in Athletes Questionnaire (BEDA-Q). The questionnaire focused on 6 items referring to eating disorder symptoms such as sense of guilt caused by overeating, desire to be thinner, satisfaction with respondents' body shape, or parents' expectation about participants being flawless. The respondents provided statements that varied from always to never. A numerical value of 3 to 0 was attributed to each statement, whereas the obtained results were in the range of 0–18 points. In addition, the questionnaire included 3 questions related to participants' attempts at reducing their body mass. In addition, the conducted research used the Questionnaire for Substance Use (QSU). It was determined that 63% of dancers tried to lose weight during their career, and 32% made attempts at reducing their body mass three times or more. Over half of the respondents (58%) used dietary supplements. Furthermore, there was a higher level of alcohol use reported by dancers who scored higher at BEDA-Q. High BEDA-Q values were also related to the absence of menstruation.

Chalcarz et al. (2014) conducted research to evaluate anorexic behaviours among female students in tourism and recreation. The research included 324 students who were 18–27 years old. The research was performed using the SGA questionnaire for anorexia readiness syndrome assessment, which was modified and extended with additional questions for the purpose of this study. The questions included in the questionnaire encompassed issues such as body mass regulation, eating attitudes, self-perception, or parental styles in family. Respondents' answers to each question varied from Yes to No, and 1 point was attributed to every response indicating any anorexic behaviour. The total number of points was added and the results were classified as follows: the range from 0 to 6 points indicated low SGA level, 7–13 points – average SGA level; whereas the range above 14 points denoted high SGA level. Of note, lower SGA level was reported by students with 1 year of completed training experience (21.1%), while the highest value for both average and higher SGA level was observed in a group with 1–5 years of training experience (50%; 50%) and 5–10 years of experience (31%; 37.5%), respectively. The use of fasting diets and reduction in food intake was declared by 19.5% of students with low SGA level and by 96.1% of students with high SGA level. Intense workout practice also differed according to the SGA level. The results are presented in the following order: 11.5% of respondents were in a group with low SGA, 35% with average level, and 79.2% with high SGA level. Similar relationships were observed between students' reduction in fat and carbohydrate intake and the SGA level: 27.6% of students had low SGA level, 74.4% of subjects had average SGA level, and 96.1% had high SGA level.

Interesting results were also obtained in the study of Aksoydan and Camci (2009) – total of 56.4% of the artists involved in the research scored below 40 in the ORTO-15 test. While the highest prevalence of orthorexia nervosa was recorded among opera singers (81.8%), it was 32.1% among ballet dancers and 36.4% among symphony orchestra musicians. The differences between the three groups were statistically significant.

Conclusions

Summarizing the results of own research and the results of other authors, it can be concluded that: Half of the dancing school female students who declared high physical activity are characterised by better dietary habits contrary to respondents reporting a lower level of activity.

The best dietary habits were reported by girls at the initial stage of learning at dancing schools (up to two years of study) – older schoolgirls had worse eating habits ((up to nine years of study).

The overall evaluation of dietary habits is strongly correlated to respondents' self-esteem – good dietary habits are largely reported by students who consider themselves as too thin.

Research results indicate that dancers are one of the occupational groups particularly exposed to orthorectic behavior, which may be the initial stage in the development of more advanced eating disorders. The highest risk was observed among girls who described their figure as 'too obese' and have good eating habits at the same time. On this basis, it can be assumed that the respondents have lowered self-esteem, but this phenomenon requires in-depth analysis in other studies.

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