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Knowledge and use of Nutritional Supplements among Hip-Hop Dancers

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Abstract

Hip-hop is a cultural movement that captures different dance styles. The complexity of choreography is increasing, and the requirements for the physical condition are simultaneously higher. To reduce the risk of muscle and joint injuries, it is essential that dancers understand the importance of proper nutrition. The purpose of our study was to analyse the use and knowledge about food supplements in the daily diet of hip-hop dancers. We also wanted to highlight the problem in the lack of nutritional knowledge and to determine if this affects their body composition. The sample consisted of 114 hip-hop dancers, average age 17.2±2.2 years, participating in adult categories, all members of the Dance Sport Federation of Slovenia and the International Dance Organization. For basic information, an anonymous questionnaire was used, followed by questions about food supplements, and doping. Body composition was analysed with an InBody 720 bioelectrical impedance device (Biospace Co., Ltd). The data were statistically processed using SPSS statistical software. We established that 42.1% of the surveyed dancers consume nutritional supplements, of which only 10.5% do so regularly. The use of food supplements and better nutrition knowledge is prevalent among more successful dancers. There is still a high percentage of those who do not consume dietary supplements, probably due to ignorance and insufficient information (48%). Better body composition in more successful dancers does not influence the knowledge and/or use of dietary supplements. Some interventional programmes about substance use and misuse might be useful in educating dancers and choreographers.

Key words: *nutrition, food supplements, body composition, dance, hip-hop*

Introduction

A dance style with a relatively short history, hip-hop has become an international phenomenon (Ojofeitimi, Bronner, & Woo, 2010). As a cultural movement, it has evolved to such an extent that it is impossible to define it as a single dance category, as it captures a number of styles that developed within hip-hop or were taken from other dance genres.

Great emphasis is placed on the quality, execution, and vocabulary of dance movement (Koutedakis et al., 2007). Hip-hop, as a form of competitive discipline, like other dance styles, entails great physical and psychological demands (Elpidoforou, 2016). Watson et al. (2017) emphasize that not only muscle strength in the lower extremities and aerobic fitness are required in dance performance, but also significant core stabilization to achieve technically proficient movement. Hip-hop choreography is combined with a wide range of dance styles, different rhythms, postures, jumps, and pirouettes (Bronner, Ojofeitimi, & Woo, 2015), each with its own requirements.

Due to their high level of technical skills, which results in great economy of movement, dance activities have a low impact on dancers' cardiorespiratory system (Koutedakis & Jamurtas, 2004) and do not pose significant physiological stress on them. As running and strength training are often

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avoided because of their effect on aesthetics (body-shape), dancers, in general, have been shown to have worse aerobic fitness in comparison to other athletes (Allen & Wyon, 2008). The latter is often confirmed with various tissue and joint injuries, caused by overwork and poor physical conditioning (Laws, 2005). Fatigue and inadequate energy intake were cited as one of the leading cause of injuries (Bronner et al., 2015).

The complexity of choreography is increasing (Koutedakis, 2000) and, at the same time, the requirements for the physical condition are higher, which leads to a greater amount and greater intensity of training. To achieve optimal dance form, besides adequate energy, an appropriate selection of nutrients must be taken into consideration. While ballet and modern dancers have problems with inadequate energy intake, due to restricted body image, urban dancers struggle with unsuitable nutrients (fast food, cold meals, etc.). Regardless of the cause, a common issue of both is the inadequate intake of micronutrients in the dancer's body, which are essential for its normal function (Maughan et al., 2018). To perform at their best, dancers need to be adequately fuelled for the activities in which they regularly participate: classes, rehearsals, and performances/competitions (Challis, Stevens, & Wilson, 2016).

Appropriate body composition, which can be achieved with a properly constructed training plan supplemented with nutrition, has been shown to play an essential part in performance criteria (Liiv et al., 2014). To reduce the risk of muscle and joint injuries, at the expense of exhaustion and fatigue, it is essential that dancers understand the importance of diet and dietary supplements.

The purpose of our study was to analyse the use and knowledge about food supplements in the daily diet of hip-hop dancers. We also wanted to highlight the problem in lack of nutritional knowledge and to determine if this affects the body composition of dancers.

Methods

The sample consisted of 100 female (87.7%) and 14 male (12.3%) dancers from seven leading Slovenian dance schools, average age 17.2±2.2 years, participating in adult categories, all members of the Dance Sport Federation of Slovenia and the International Dance Organization.

An anonymous questionnaire was used, containing basic information about the dancer, followed by questions on food supplements, general nutrition and doping (Sekulić, Perić, & Rodek, 2010; Kondrič, Sekulić, Uljević, Gabrilo, & Žvan, 2013). Body composition was analysed with an InBody 720 bioelectrical impedance (Biospace Co., Ltd); body height was measured with an anthropometer.

The collected data were analysed using the SPSS statistical software, 23.0.0 for Mac OS X; some graphical presentations were presented with Microsoft Excel 2017. The basic statistical parameters were calculated for all variables. The level of significance was set at $p \leq 0.05$.

Numeric data were verified for normality of distribution using Shapiro-Wilk's test, and the homogeneity of variances with Levene's test. Kruskal-Wallis ANOVA and Two-way ANOVA and Fisher's Exact Test were used to determine the differences between groups. The differences between individual groups of variables were verified with the PostHoc test. To determine the relationship between body variables, Pearson's coefficient of correlation was used.

The study was approved in advance by the Faculty of Sport Ethics Committee. All the participants agreed to contribute as volunteers and signed informed consent prior to testing.

Results

The sample for the presented study was composed of 114 hip-hop dancers (14 male and 100 female), sorted into three groups. The division was based on their competition successes/results in the previous two years and the subjective assessments of a panel of experts (trainers and judges) on the individual's talent, progress, and engagement in training and in preparations for competitions.

Trainers were assisted by the following division, which was used in the previous study (Pruš, 2015):
Rank 1: Finals at the European and World Championships.
Rank 2: Ranking in the semi-finals at the European and World Championships.
Rank 3: Ranking in the finals of the national championship.
Rank 4: Ranking in the semi-final at the national championship.

The general characteristics of the respondents are presented in Table 1. The average age of dancers and number of years dancing is 17.23±2.21 years (min=15.8, max=28.0) and 8.24±3.53 years, respectively. The most successful dancers were the oldest (18.10±2.95 years) and most experienced (9.40±4.24 years of training). From the table below, it can be seen that significant differences in body composition (height p=0.03, weight 0.03, WHR p=0.05) only appear among female dancers of different ranks, while measurement data for male dancers are not significantly different. Among male participants, career length is the only factor that statistically (p=0.02) influences the success of dancers.

Table 1. General characteristics of hip-hop dancers

	Rank	Age M±SD	Years active M±SD	Height M±SD	Weight M±SD	BMI M±SD	%BF M±SD	WHR M±SD
Female	Total	N=114	17.2±2.21	8.24±3.53	166.8±5.98	59.93±7.01	21.75±2.10	22.09±6.02
	1 N=39	17.73±2.68	9.00±4.03	164.13±5.28	58.95±6.58	21.88±2.13	23.55±4.66	0.85±0.04
	2 N=30	16.71±1.42	8.10±3.10	165.67±4.24	57.40±6.58	20.94±2.15	22.69±4.75	0.84±0.03
	3 N=31	16.37±1.06	7.39±2.23	167.21±4.36	61.95±7.33	22.01±2.44	23.84±5.92	0.86±0.04
	F	4.73	2.12	3.71	3.56	2.16	0.42	2.99
	p	0.01*	0.13	0.03*	0.03*	0.12	0.66	0.05*

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	Rank	Age M±SD	Years active M±SD	Height M±SD	Weight M±SD	BMI M±SD	%BF M±SD	WHR M±SD
Male	1 N=6	20.48±3.76	12.00±5.06	174.42±6.16	63.60±6.65	20.90±1.83	12.60±5.41	0.81±0.02
	2 N=6	17.53±1.48	6.17±2.56	176.33±3.63	60.75±4.47	19.55±1.53	9.57±2.59	0.78±0.02
	3 N=2	17.65±0.50	3.50±0.71	181.25±0.35	72.10±2.12	21.95±0.74	10.75±0.28	0.79±0.02
	F	1.97	5.30	1.51	3.26	2.01	0.85	2.53
	p	0.19	0.02*	0.26	0.08	0.18	0.45	0.12
Total	1 N=45	18.10±2.95	9.40±4.24	165.50±6.30	59.57±6.71	21.75±2.11	22.09±6.02	0.84±0.04
	2 N=36	16.85±1.44	7.78±3.07	167.44±5.75	57.96±6.3	20.71±2.10	20.51±6.65	0.83±0.04
	3 N=33	16.45±1.08	7.15±2.36	168.06±5.43	62.56±7.52	22.02±2.37	23.05±6.56	0.86±0.04
	F	6.68	4.56	2.04	4.02	3.61	1.41	4.25
	p	0.00*	0.14	0.02*	0.02*	0.03*	0.25	0.02*

Legend: BMI - body mass index, %BF - percentage of body fat (%), WHR - abdominal obesity degree

Prevalence and frequency of nutritional supplement use

Despite the fact that supplements have been a part of sports science for some time, we were interested in the extent to which they appear on the dance scene. We found that 42.1% of the surveyed dancers consume nutritional supplements, of which only 10.5% did so regularly. There is still a high percentage of those who do not consume dietary supplements at all (57.9%). The results displayed in Table 2 show that there are no significant differences (p>0.05) between usage of supplements between male and female dancers.

Table 2. Data regarding the frequency of nutritional supplement use based on gender

		Females		Males		Total		Fisher's Exact Test	p
		N	%	N	%	N	%		
Consumption of nutritional supplements	Yes	9	9.0	3	21.4	12	10.5	2.13	0.37
	Occasionally	32	32.0	4	28.9	36	31.6		
	No	59	59.0	7	50.0	66	57.9		

The use of nutritional supplements is prevalent among more successful dancers, seen in Table 3. There are no significant differences between different ranks of dancers based on the use of individual supplements, but we can see that energy tabs, vitamins, and drinks for regeneration are most common. Almost 50% of the most successful dancers from Rank 1 occasionally use energy bars, and 40% also vitamin and mineral supplements. Dancers from Rank 2 use these food supplements more rarely; nevertheless, the percentage of people who never take food supplements is still quite large.

Table 3. Comparison of supplement use between different ranks of dancers.

	Rank		vitamins	carbohydrates	proteins	isotonic	iron	drinks for regeneration	energy tabs
every day	1	N	7	4	4	0	1	0	0
		%	15.6	8.9	8.9	0.0	2.2	0.0	0.0
	2	N	3	2	2	0	0	0	1
		%	8.3	5.6	5.6	0.0	0.0	0.0	2.8
	3	N	4	1	0	1	1	0	1
		%	12.1	3.0	0.0	3.0	3.0	0.0	3.0
occasionally	1	N	18	3	9	9	4	10	22
		%	40.0	6.7	20.0	20.0	8.9	22.2	48.9
	2	N	11	3	1	4	3	3	8
		%	30.6	8.3	2.8	11.1	8.3	8.3	22.2
	3	N	8	4	5	6	4	5	12
		%	24.2	12.1	15.2	18.2	12.1	15.2	36.4

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	Rank		vitamins	carbohydrates	proteins	isotonic	iron	drinks for regeneration	energy tabs
rarely	1	N	4	3	5	9	9	5	5
		%	8.9	6.7	11.1	20.0	20.0	11.1	11.1
	2	N	3	3	7	10	8	7	10
		%	8.3	8.3	19.4	27.8	22.2	19.4	27.8
	3	N	4	2	5	2	4	1	3
		%	12.1	6.1	15.2	6.1	12.1	3.0	9.1
never	1	N	16	35	27	27	31	30	18
		%	35.6	77.8	60.0	60.0	68.9	66.7	40.0
	2	N	19	28	26	22	25	26	17
		%	52.8	77.8	72.2	61.1	69.4	72.2	47.2
	3	N	17	26	23	24	24	27	17
		%	51.5	78.8	69.7	72.7	72.7	81.8	51.5
		F	0.82	0.03	0.12	1.56	0.25	1.32	0.64
		p	0.44	0.97	0.89	0.26	0.78	0.29	0.51

The most common reason that dancers do not use dietary supplements is the lack of knowledge and insufficient information (48%). From Figure 1, it is evident that the price limits 6% of respondents, and 14% think that food supplements are not healthy.

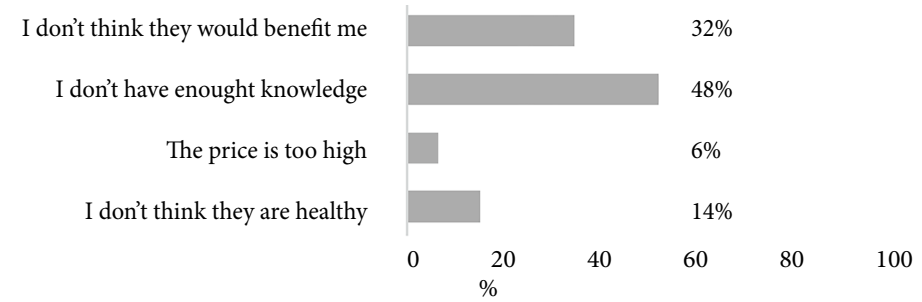

Figure 1. Restrictive factors of supplement use of hip-hop dancers

Knowledge of nutrition and supplement use

The dancers think that their knowledge of nutrition and nutritional supplements is quite good, which is contrary to our findings, which are presented below. We compared dancers' knowledge according to the ranking, years of training, and their interactions.

Overall, dancers' knowledge of nutrition is 3.49±1.98 on a scale from 1-10. The statistically significant difference between various ranks shows that dancers of Rank 1 have better nutritional knowledge (4.33±1.85) than the remaining two ranks (3.33±1.99 or 2.52±1.70). A statistically significant difference is evident between Ranks 1 and 2 (p=0.04) as well as between 1 and 3 (p=0.00), while there were no statistically significant differences between Ranks 2 and 3 (Table 4).

Table 4. Interaction of rank of successfulness and age of the dancers on their knowledge of nutritional supplements

	Rank of successfulness			Age			Difference					
	Rank 1 N=45	Rank 2 N=36	Rank 3 N=33	U17 N=67	O17 N=47	Total N=114	rank		age		interaction	
N.K.	M±SD	M±SD	M±SD	M±SD	M±SD	M±SD	F	p	F	p	F	p
	4.33±1.85	3.33±1.99	2.52±1.70	3.07±1.81	4.09±2.08	3.49±1.98	8.9	0.00*	5.0	0.03*	0.68	0.51

Legend: N.K. - Nutritional knowledge; U17 – Under 17; O17 – Over 17

From the conclusion that a formal and non-formal education contributes to better knowledge, which should improve with age, we divided the dancers into two age groups. It turned out that older dancers who, as a result, also have higher education, have better knowledge of nutrition than their younger companions (p=0.03). The interaction of the ranking and age did not show statistically significant differences in diet knowledge (p=0.51).

Body composition in relation to knowledge of nutrition and supplement use

Six variables were selected for the analysis of body composition, which best represents body image and which are, in addition to genetics and training, associated with proper nutrition. Dancers' knowledge about nutrition and supplements use, assessed for 1-10, was classified into five ranks (1 - no knowledge, 2 - poor knowledge, 3 - fair knowledge, 4 - good knowledge, 5 - excellent knowledge).

Better knowledge and/or use of dietary supplements do not influence body composition in more successful dancers, as shown in Table 5.

Table 5. Comparison of body composition based on use and knowledge of nutrition and nutrition supplements

Body composotion	no knowledge			poor knowledge			fair knowledge			good knowledge			Differences:					
	tot	yes	no	tot	yes	no	tot	yes	no	tot	yes	no	use		knowledge		interaction	
	M	M	M	M	M	M	M	M	M	M	M	M	F	p	F	p	F	p
ATT	59.38	57.76	59.84	61.86	63.38	61.12	59.49	59.96	58.92	58.91	58.40	60.20	0.01	0.94	1.03	0.38	0.42	0.74
FFM	45.53	45.76	45.47	48.70	49.15	48.48	46.69	46.94	46.40	45.11	43.96	48.00	0.17	0.69	119	0.32	0.28	0.84
%BF	22.92	20.89	23.49	20.98	22.20	20.37	21.46	21.68	21.19	23.09	24.24	20.21	0.29	0.59	0.11	0.96	0.62	0.60
WHR	0.85	0.83	0.85	0.85	0.86	0.84	0.84	0.85	0.83	0.84	0.84	0.82	0.86	0.36	0.59	0.62	1.27	0.29
BMI	21.39	21.13	21.46	21.95	22.29	21.77	21.31	21.59	20.97	21.81	22.08	21.15	0.51	0.48	0.60	0.62	0.26	0.87
FS	75.38	77.71	74.72	78.25	77.13	78.81	77.26	77.36	77.13	77.14	76.20	79.50	0.11	0.74	0.51	0.68	1.11	0.35

Legend: M - mean, ATT - body weight (kg), FFM – fat-free mass (kg), %BF - percentage of body fat (%), WHR - abdominal obesity degree, BMI - body mass index, FS - fitness score

Discussion

Nutrition and dietary supplements represent an indispensable part of physical conditioning for people participating in sport competitions. Their contribution to the success of athletes is probably small, but nevertheless very valuable.

Many studies showed that the use of dietary supplements in sport is already widespread throughout the world (46-91%) (Diehl et al., 2011), while in dancing the percentage of regular use is somewhat lower (Burckhardt, Wynn, Krieg, Bagutti, & Faouzi, 2011). Use of supplements among hip-hop dancers, at 42%, is otherwise comparable with other athletes, but only 10% use supplements regularly. The percentage is lower than in the international survey by Brown and Wyon (2014), in which the share of dancers with the same opinion represented 29%, but still indicates the lack of education of dancers regarding this. Approximately 32% of dancers feel they are eating well and think using food supplements will not benefit their fitness.

The most common supplements used among hip-hop dancers are vitamins, energy bars, and regeneration drinks, which are also easily accessible for the consumer and, at the same time, do not require much knowledge. It is not surprising that vitamin supplements prevail in the diet of dancers, as it has also proved to be the main one used in other dance genres (Burckhardt et al., 2011; Laws, 2005). The dancers use vitamin supplements to maintain health, to strengthen their immune systems, to reduce and delay the onset of fatigue and, consequently, to prevent injury (Brown & Wyon, 2014).

Considering that the training of hip-hop dancers, for most of the season, takes place three times a week for 90 minutes, we think that this enables sufficient regeneration time during individual training without the use of dietary supplements. The nature of dance training does not match the physical demands of the final performance itself. Therefore, dancers in the last steps before the competition or performance, due to the increased amount of training, are subjected to greater physical efforts. We can conclude that dancers use supplements just when the amount and duration of training are increased, and the time for regeneration is reduced. The latter is probably also the reason for the use of dietary supplements in competitions that last the entire day, National, European and World championships, even for several days together. Dancers do not have much time between performances, so they aim to replace as much energy as possible and to balance the electrolyte equilibrium with isotonic drinks.

In competitive dance training itself, there is no need for a constant substitution of energy supplies, but they can occur just before important competitions when training sessions are more frequent, and the intensity of them is much higher. The training sessions before major competitions or performances are more oriented at acquiring general endurance than the technical implementation of choreography itself. Dancers perform choreography as best as they can at intervals in which they improve only individual parts of the competition choreography or the whole performance, which, for example, lasts between 2.5-3 minutes in the hip-hop formation adult category (at a pace of 120 beats per minute). Knowing the meaning and proper use of nutritional supplements can considerably ease the training as well as accelerate regeneration during training.

The knowledge of nutritional supplements of hip-hop dancers, regardless of performance ranking, is still lower compared to that in other sports disciplines (Kondrič et al., 2013). Despite the fact that hip-hop is considered a social phenomenon, and dance is becoming increasingly popular in recreational sports, the knowledge of the population involved in the training process is still limited. The dancers join the adult categories upon entering high school. Because of their success, we often forget about age and related awareness of the maturity of an athlete, an essential part of which is nutrition.

That is why we compared the knowledge according to two age categories. The data analysis showed statistically significant differences between the categories in which dancers older than 17 years showed better knowledge. From that,

we can conclude that more successful hip-hop dancers have more knowledge about nutritional supplements, which is influenced by age and education. We anticipate that older dancers are more concerned with the aesthetic and body image of themselves on the stage or in front of the judges. They are aware that with better physical fitness, which is easier to achieve with the help of dietary supplements, they can be more effective in performing choreographies. The average values in other sports (synchronized swimming, swimming, table tennis) range between 5 and 7 (Furjan-Mandić, Perić, Krželj, Stanković, & Zenić, 2013; Kondrič et al., 2013; Šajber, Rodek, Escalante, Olujić, & Sekulić, 2013). The results obtained by the dancers are comparable with the results of the knowledge of Slovenian and Croatian badminton players whose average values (3.50±0.80 or 2.58±0.93) are also lower than the average (Šeme, 2016).

The dancers confessed that the main reason why they do not use the dietary supplements is lack of knowledge or they think that supplement will not be in any use to them. Brown and Wyon (2014) also highlight the importance of knowledge as the determining factor for the use of nutritional supplements. Dance still represents a hobby in Slovenia, only a few (coaches and dancers) get to develop their professional careers. Many coaches in street dance do not have formal education, or coaching represents a second profession for which they do not have enough time to develop. The problem is that choreographers and dancers devote more training (dance camps) to technical improvements and learning different dance styles than to physical conditioning and related dietary habits.

Examining the analysis of the body composition according to the rank of performance, we can see that the best results have dancers from Rank 2, which is in contrast to the previous survey (Pruš, 2015). Rank 2 is represented by several younger dancers who are still considered to be very successful, which means that they are quite comparable with dancers from Rank 1. Probably, according to their age, they have not yet had the opportunity to show themselves at major competitions as their colleagues from the first rank have had. However, the measurements of their body composition show their potential, which they will probably be able to develop through their dance style, greater participation in competitions and, above all, greater opportunities in the next two years.

We believe that those involved in the study of nutritional supplements do not consume supplements often enough so that the results can be reflected in their body composition. In addition, dancers reported more frequent use of vitamin and mineral supplements, isotonic and regeneration drinks and energy bars, which have no long-term effect on the body. The majority of participants was represented by female dancers; therefore, male dancers had a small impact on the research data. Nevertheless, the sample of participants in our study represents an authentic picture of dancers in the Dance Sport Federation of Slovenia.

To the best of our knowledge, this is the first research in the field of hip-hop dance, which can be the starting point for further analysis in the field of dance nutrition. We believe that proper nutrition must also find its place in the everyday life of a hip-hop dancer and in some way also be transferred to other dance genres, according to their training and competition requirements. We can conclude that nutrition knowledge among Slovenian dancers is very poor, so it would be wise to implement intervention programmes for young dancers and place nutrition in training courses for dance coaches in Slovenia. The first step towards informing dancers and choreographer about nutrition could be through the Dance Sport Federation of Slovenia, which organizes representative meetings once a year for all registered dancers. The class or workshop could be performed by an expert on sports nutrition with practical advice for young dancers.

Finally, a retrospective study of 232 dancers by Ojofeitimi, Bronner, and Woo (2010) reported an annual injury incidence of 237%, of which more than half (55%) were lower extremity injuries. Following the fact, it would be wise to explore also if there is any significant connection between injury incidence and knowledge and use of nutrition supplements.

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Conflict of Interest
The authors declare that there are no conflicts of interest.

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