Wrestlers' health – biological, behavioural and axiological aspects

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Abstract

Background and Study Aim: The aim of this paper is to analyse health potential of wrestlers from the wrestling national team. The analysis is based on body composition, health valuation and implementation of selected health behaviours.

Material/Methods: The research was carried out in the Wrestling Centre in Poznań, Poland in 2010. It involved twenty members of the Polish national wrestling team (ten girls and ten boys participating in the European Qualifications for the 1st Youth Olympic Games (YOG) in Singapore. The average age of the sample group was 16.5 years for boys (M=16.50; Sd=0.53) and for girls 15.6 years (M=15.60; Sd=0.52). Competitors underwent anthropometrical and body composition examination (Bioelectrical Impedance Analysis – BIA). Evaluation made use of the List of Personal Values (LoPV), International Physical Activity Questionnaire (IPAQ), as well as an authorial questionnaire.

Results: Mean body mass index of girls and boys, and their body composition are within standard values. Yet, among boys tissue composition is less varied than among girls. What is more, in several cases girls' fat mass exceeded standard values. Young sportsmen and sportswomen appreciate health, however, it is rarely a superior value for them. Though smoking is not a problem, these young people tend to experiment with intoxicating substances, which is far more disturbing.

Conclusions: Physical activity regulating energetic balance may be an efficient method in preventing fat accumulation by wrestling girls and boys. In concern about competitors' health at present and in the future it is crucial to include health education into their sport training, which not only will allow them to achieve momentary sport success, but also may help to shape their long-term attitudes towards health and fitness.

Key words: wrestling • health • body composition • health valuation • health behaviours

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Health – is defined in the Constitution of the World Health Organisation of 1948 as a state of complete physical, social and mental well-being, and not merely the absence of disease or infirmity [33].

Body composition – is the proportion of fat to fat-free mass in the body. People with a higher proportion of fat-free mass to a lower proportion of body fat have a healthy body composition [35].

Background

In traditional medical approach **health** is treated as a physiological-biological state. Researchers highlight influence of unbalanced diet on **body composition**. Low level of **physical activity** contributes to an increased level of fat component, which may lead to a disease [1–3]. Maintaining proper body weight makes that risk level lower, as well as decreases mortality rate which is much higher for obese people than slim ones [3,4].

In contemporary approach health is understood also as psycho-social functioning of a human being. WHO defines health not only as lack of illness, but also as an overall well-being in biological, psychological, and social sense [5]. According to **health promotion** assumptions, health potential is strengthened mainly by individual **health behaviours**. Thus, physical activity is perceived as an essential element of healthy **lifestyle**, potentially integrating its remaining elements. Yet, results of empirical research are not clear-cut [6–10]. Therefore,

co-existence of physical activity with other health behaviours requires further investigation, and in this paper it is based on the example of sports environment. A sportsman's organism can endure maximal load only when they are in full health. That is why those who want to be successful in sport should combine physical activity with strengthening their health potential via pro-health behaviours.

The aim of this paper is to analyse health potential among competitors from the wrestling national team, with particular reference to their body composition, health valuation, and selected health behaviours.

Material and Methods

Research was carried out among competitors from the Polish national team who took part in the European Qualifications for the 1st Youth Olympic Games on 14–26 August 2010. The International Federation of Associated Wrestling Styles (FILA) organised qualification competition on each continent in May 2010. In 2008 the Polish Wrestling Association, with assistance of the city of Poznań, Poland volunteered to organise such qualification competition, and was assigned that task by FILA. It was the only competition of such type in Europe. Contestants competed in free style, classic wrestling, and women wrestling. The conditions necessary to qualify for the YOG was competitor's age – born between January 1, 1993 and December 31, 1994, as well as membership in the National Federation with FILA licence for the year 2010. The average age of the sample group was 16.5 years for boys (M=16.50; Sd=0.53) and for girls 15.6 years (M=15.60; Sd=0.52).

The research was carried out in the Wrestling Training Centre in Poznań, where competitors were preparing for the YOG European Qualification Competition. Twenty competitors took part in the research (10 girls and ten boys). For most of them (70%) wrestling was the only sports discipline trained so far. Average time of training was five years (girls 5.5; boys 4.4), with twenty months of average membership in the national team (girls 30; boys 15).

The empirical variables in the study were obtained from anthropometrical measurements of two features (height and body mass), and body composition measured with use of the **Bioelectrical Impedance Analysis** (BIA) [11] with use of Akern – BIA 101, a device analysing body composition. It makes use of changes in values of electric field surrounding human body in the process of induction. Two basic measurements are needed for that examination: height and body mass. It also requires age of the tested person to be determined. The current of minimal intensity (0.8 μA) is run through the body, which is imperceptible. It measures changes in two parameters: resistance (index of overall water volume in an organism) and reactance (index of protein-lipid cell membranes) and informs about mutual dependencies and level of particular body mass components.

The following body mass components were evaluated: fat mass (FM), fat free mass (FFM), body cell mass (BCM), total body mass and total body water (TBW), as well as extracellular water (ECW) and intracellular water (ICW). Water, being a good electricity conductor, points to a fat and fat free mass level. Large amount of water is signalled by low resistance, which usually happens in slim bodies, thus low resistance indirectly points to high fat free mass – and the other way round. Therefore, simple equations treating body mass as a sum of fat and fat free mass provide information about body composition. Mutual proportions and intra- and extracellular mass of fat free are presented in changes of reactance. Interactions between resistance and reactance are established on the basis of phase relation equations. Reliability of BIA method was confirmed in numerous tests [2,11–13]. In this paper percentage distribution of components in total body mass was used.

List of Personal Values (LoPV) by Juczyński [14] was selected to place position of health in one's declared axiological system. The questionnaire consisted of two parts. The first one contained a list of nine "happiness symbols", the second – "personal values". Each of them was completed in two stages. At first one chose five „happiness symbols" and then arranged them from the most (5 points) to the least valuable (1 point). The "personal values" part was completed in a similar way; five most important values were first chosen, and then arranged in order.

Physical activity level was evaluated in the basis of the International Physical Activity Questionnaire – IPAQ [15–17]. It is at present considered to be one of the best questionnaires in the world to evaluate physical activity of people aged 15–69 years. The questionnaire consists of seven questions concerning all kinds of physical activity (also relating to everyday life, work, relaxation). It takes into consideration activities performed at work, at home, time spent on exercises; describes time spent sitting, walking and in active movement; yet, those activities should last incessantly for at least 10 minutes. IPAQ makes use of metabolic equivalent – 1 MET.

Another means of evaluation of health behaviours was an authorial questionnaire, consisting of 22 questions concerning nutrition, physical activity, stimulants and stress level.

Physical activity – involves any bodily movement that is a consequence of skeletal muscle activity which results in energy expenditure. Within the framework of physical activity one distinguishes: physical activity in one's free time, physical exercises, sport, work, household activities and other factors influencing the general body's energy balance [34].

Health promotion – is the process of enabling people to increase control over, and to improve their health [33]. The two major mottos in health promotion are: 'Your health in your hands' and 'I am responsible for my health'.

Health behaviour – consists of all actions which, in the light of modern medical science, evoke certain positive or negative health effects with people who undertake these actions. Health behaviour determines an individual's general well-being and health in 53 per cent.

Lifestyle – is a way of living based on identifiable patterns of behaviour which are determined by the interplay between an individual's personal characteristics, social interactions, and socioeconomic and environmental living conditions. This includes patterns of social relations, consumption and entertainment. A lifestyle, typically, reflects an individual's attitudes, values or worldview [33].

Bioelectrical Impedance Analysis (BIA) – is a method of estimating body composition, which means that it measures how much of the body weight is fat and how much is non-fat (bone, muscle, body water, organs, and body tissues). The analysis is relatively simple, fast and non-invasive [11].

Table 1. Anthropometrical features and body composition of wrestlers.

	Height [cm]	Body mass [kg]	BMI [kg/m²]	FM %	FFM %	BCM %	TBW %	ECW %	ICW %
Girls N=10									
M	164.13	57.40	21.25	21	79	55	59	46	54
Sd	7.17	9.57	2.25	4	4	2	3	2	2
Min	154.50	44.00	17.40	15	72	49	53	42	50
Max	179.00	70.00	25.10	28	85	58	63	50	58
Boys N=10									
M	171.57	65.90	22.2	9	91	57	67	43	57
Sd	9.12	14.94	3.20	2	2	6	2	5	5
Min	158.00	45.00	18.00	5	89	48	65	32	49
Max	183.50	89.00	28.70	12	95	70	70	51	68

FM – fat mass; FFM – fat free mass; BCM – body cellular mass; TBW – total body water; ECW – extracellular water; ICW – intracellular water.

Table 2. Norms for fat mass according to *Bodystat Ltd.* for age group 10–17.

Age	Girls N=10		Boys N=10	
	Low%	High%	Low%	High%
10÷17 years	18	25	12	18

Table 3. LoPV – symbols of personal happiness – mean values of importance and distribution of significance (total of respondents N=20).

Symbols of happiness	Mean value of importance	SD	Distribution of significance (%)					
			1	2	3	4	5	0
1. Many friends	3.00	1.65	20.00	20.00	35.00	5.00	5.00	15.00
2. Being needed by others	2.35	2.03	25.00	5.00	20.00	15.00	0.00	35.00
3. Success at work, school	2.10	1.77	15.00	10.00	10.00	25.00	15.00	25.00
4. Good health	2.00	1.72	10.00	15.00	10.00	20.00	20.00	25.00
5. Life full of adventure, journey	1.45	2.01	15.00	10.00	5.00	0.00	15.00	35.00
6. Successful family life	1.45	1.39	5.00	5.00	10.00	15.00	10.00	25.00
7. Good financial situation	0.85	1.57	0.00	15.00	5.00	5.00	0.00	75.00
8. Fame, celebrity	0.60	1.43	5.00	5.00	0.00	5.00	5.00	80.00
9. Doing favourite job	0.35	1.76	5.00	10.00	5.00	15.00	5.00	55.00

Distribution: 1 – the most important value; 0 – not selected.

Results

In the analysis of health potential in the tested group morphological features (height, body mass and BMI) were taken into consideration. Then, with use of BIA, body composition was determined (describing percentage distribution of particular components in total body mass). Basic statistical characteristics were calculated for the analysed features (Table 1). Fat mass results were referred to *Bodystat Ltd.* norms for girls and boys aged 10–17 (Table 2).

Regular participation in sports trainings of young wrestlers is the sort of physical activity that influences development of their height and weight proportions. Mean BMI values of girls (21.25) and boys (22.2) are within standard range (according to WHO BMI=18÷25).

Table 4. List of Personal Values – mean values and distribution of significance (total of respondents N=20).

Symbols of happiness	Mean value of importance	SD	Distribution of significance (%)					
			1	2	3	4	5	0
1. Love, friendship	2.60	1.70	25.00	5.00	15.00	10.00	45.00	0.00
2. Good health, physical and mental fitness.	2.55	1.57	10.00	30.00	5.00	30.00	15.00	10.00
3. Joy, satisfaction	1.95	1.96	15.00	10.00	20.00	5.00	10.00	40.00
4. Sense of humour	1.75	2.02	20.00	5.00	5.00	15.00	10.00	45.00
5. Knowledge, wisdom	1.55	1.93	10.00	15.00	5.00	15.00	0.00	55.00
6. Attractiveness, appearence	1.35	2.06	15.00	10.00	5.00	0.00	5.00	65.00
7. Intelligence, wit	1.30	1.53	0.00	10.00	20.00	10.00	10.00	50.00
8. Courage, firmness	1.10	1.71	5.00	10.00	10.00	5.00	5.00	55.00
9. Wealth	0.70	1.49	5.00	0.00	15.00	0.00	0.00	80.00
10. Kindness, softness	0.40	1.05	0.00	5.00	0.00	10.00	0.00	85.00

Table 5. Classification of physical activity level according to IPAQ (percentage distribution).

Physical activity level	Respondents		
	Total N=20	Girls N=10	Boys N=10
High	**95.00**	90.00	100.00
Sufficient	**0.00**	0.00	0.00
Insufficient	**5.00**	10.00	0.00

Table 6. Reasons for undertaking physical activity declared by respondents (percentage distribution).

Motives	Respondents		
	Total N=20	Girls N=10	Boys N=10
Keeping fit	**65.00**	50.00	80.00
Success in sport	**50.00**	40.00	60.00
Improvement, staying healthy	**15.00**	20.00	10.00
Attractive appearence	**10.00**	20.00	0.00
Good results in fitness tests	**10.00**	20.00	0.00
Relaxation	**50.00**	40.00	0.00

Wrestling boys' body components displayed low mean content of fat mass (M_{FM}=9%) which denotes high level of fat free mass (FFM). Wrestling girls are characterised by proper mean content of fat mass (M_{FM}=21%) when referred to population norms, yet there is quite a variation of individual values of this component. Programmed physical activity in form of systematic trainings influences favourably the level of tested body components in both wrestling girls and boys.

The List of Personal Values was used to measure competitors' relative value of health. As the distribution of results shows (Table 3) *good health* took the fourth place among nine symbols of personal happiness and was rarely assigned the highest significance (10%). At the same time *good health,* being identified with physical and mental fitness, occupied second position among ten most important personal values, though again not many people acknowledged its significance in the first place (Table 4). Only 10 per cent of respondents did not find health as one of five most important personal values. Using square-chi test for the highest probability solely for *being needed* value revealed dependency from sex of respondents ($p<0.05$). What is interesting, this value is less appreciated by girls (as many as 60% did not choose it at all).

Table 7. Respondents' attitude towards stimulants (percentage distribution).

Stimulants	Respondents		
	Total N=20	Girls N=10	Boys N=10
Smoking			
No, I have never smoked	**95.00**	100.00	90.00
No, but I used to smoke	**5.00**	0.00	10.00
Yes, I smoke	**0.00**	0.00	0.00
Alcohol consumption			
No	**50.00**	70.00	30.00
Yes, occasionally in small amounts	**45.00**	30.00	60.00
Yes, occasionally in large amounts	**5.00**	0.00	10.00
Yes, regularly	**0.00**	0.00	0.00
Using intoxicating substances			
No, never	**55.00**	80.00	30.00
Yes, I tried once	**35.00**	20.00	50.00
Yes, a few times a year	**10.00**	0.00	20.00
Yes, a few times a month	**0.00**	0.00	0.00

Table 8. Frequency of stress occurrence (percentage distribution).

Frequency	Respondents		
	Total	Girls	Boys
In everyday life			
Rarely	**45.00**	20.00	70.00
Sometimes	**50.00**	80.00	20.00
Often	**5.00**	0.00	10.00
Before sports competition			
Rarely	**20.00**	10.00	30.00
Sometimes	**55.00**	50.00	60.00
Often	**25.00**	40.00	10.00

Another stage of the analysis evaluated elements of respondents' healthy lifestyle. First, with use of IPAQ high physical activity of young wrestlers was confirmed (Table 5).

It seemed interesting to know whether health is for the respondents an important reason to undertake physical activity. They could mark several answers (Table 6).

Research showed that motives for which young competitors are physically active are improvement of fitness and achievement of sport success. Concern about health is not among significant motives for undertaking physical activity.

The paper also focuses on dietary habits with reference to recommendations included in the Golden Card of Nutrition [18]. The analysis of regularity of meals reveals that the majority of respondents (65%) eat three meals per day, while 35% – more than three. At the same time 75% declare that they eat breakfast every day. In diet of the respondents both favourable habits are to be noticed (consumption of vegetables, water, vegetable and fruit juices), as well as unfavourable (sweets, red meat, rare consumption of fish and plant oil). Moreover, it turns out that the majority of respondents (75%) change their dietary habits to keep in their weight class, and consume special nutrients at least four times a week (65%). Such behaviour occurred irrespective of wrestlers' sex.

The following step was to evaluate respondents' approach to stimulants (Table 7). Girls tend to reveal pro-health behaviours in this respect. What is rather disturbing is

the fact that most boys have already tried alcohol and other intoxicating substances.

The final health behaviour tested was frequency with which the respondents find themselves under stress (Table 8).

The majority of respondents chose "sometimes" in both everyday life and before competition. It should be noted that girls more often feel stressed in everyday life.

Discussion

Results of numerous research show that physical activity plays a significant role in decreasing body mass, and counteracts unfavourable effects caused by excessive fat tissue [1,3,19–21]. Body components of wrestlers who took part in examination point to good proportions, which could have been influenced by long-term, regular trainings. The high level of fat free mass (FFM) in wrestlers representing various styles was confirmed in the research by López-Gullón et al. Wrestlers of various styles (i.e., Freestyle *vs.* Greco-Roman style) in the same weight class (i.e., light, middle and heavy weight) showed no significant differences in absolute and normalized values of fat free mass in the crank-arm Wingate test. No differences were observed in any of the anthropometrical and physical characteristics between the Freestyle and the Greco-Roman wrestling groups, except for the height and the BMI in the Light Weight class. The Light Weight Greco-Roman groups showed significantly higher values in body height and the BMI in comparison with Light Weight Freestyle groups [22]. Excess of fat may lead to many diseases. Obesity increases risk of hypertension, cardiac infarct, diabetes or even tumour. Risk of disease is not only determined by genetic conditions, but also many endo- and exogenous factors [4,23–25]. Wrestling girls, contrary to wrestling boys, have tissue composition more varied. Several cases of girls with fat mass higher than norm (26% and 28%) may result from wrong individual dietary habits.

Health valuation is an important element of issues concerning health consciousness, since it is the hierarchy of values and needs that forms the basis of preferred lifestyle. It is clear that tested group of girls and boys appreciate **health as a value**, yet it is rarely perceived as the highest value. Similar results were obtained in research concerning role of health in axiological system of young people [14,26]. In the group researched for the purpose of his study maintaining good heath is only a secondary motivation behind the decision to take physical exercise. However, the research by Nowak et.al. shows that heath reasons are the main motivation for amateur sumo wrestlers to take physical exercise [27].

Adolescence is the time when health behaviours acquired in earlier periods of life become established, and are carried further into adulthood. The tested group of respondents display favourable habits as far as physical activity is concerned, which distinguishes them among young people in Poland [28]. It should be underlined that these people have not acquired the habit of smoking. This is optimistic news, for as the research shows, only 6% men and 16% women started to smoke over the age of 25, but the majority of them started smoking being under 20 years old, and they continue this habit for the next 30–40 years [29]. Fortunately, anti-smoking campaigns and non-smoking fashion have become more popular in our society lately, which results in decreasing number of smoking pupils [30]. What is disturbing, however, is the fact that these young wrestlers experiment with intoxicating substances.

Sportsmen and sportswomen should pay special attention to what they eat, since their diet may influence favourably their health, as well as sport results. The research shows that respondent's dietary habits are eclectic and require further pro-health modifications.

It is advisable that sports clubs should adopt the pro-health objective similar to the one fostered during PE classes in Polish schools [31]. Coaches should concentrate not only on leading their trainees to success in sport, but they should also try to teach them a positive, health-oriented lifestyle. It should be highlighted that there is a big discrepancy between the cognitive and behavioural aspects of people's attitude to health, which is because pro-health actions only promote knowledge about health [32]. It is vital that young sportspeople in their sports clubs are taught proper skills and habits to take care of their health in a long-term perspective. The trainees' awareness of the importance of health-oriented lifestyle can contribute to the process of a successful ontogenesis.

Conclusions

1. Systematic physical activity as a regulator of energetic balance may be an effective method in preventing fat tissue accumulation by wrestling girls and boys.
2. In concern about current and future health of sportsmen and sportswomen it is essential to include elements of pro-health education in the process of sports training. This may be a good way not only to achieve momentary sports success, but also to shape favourable long-term attitude towards health and fitness.

Health as a value – health is a value which enables an individual or a group to fulfil their ambitions and needs, as well as to change and adjust to a new environment. Health is a crucial value, which constitutes an element of a wider axiological system, and is closely connected with other important aims of life.

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