

# THE USE OF SUPPLEMENTATION AMONG PEOPLE PRACTICING POWERLIFTING AND ITS CONNECTIONS WITH THEIR SELF – ESTEEM AND BODY VALUE

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<sup>A</sup> Study Design; <sup>B</sup> Data Collection; <sup>C</sup> Statistical Analysis; <sup>D</sup> Manuscript Preparation; <sup>E</sup> Funds Collection

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**Abstract** Supplementation is one of the forms of powerlifting training support. It may have an influence on physical parameters of the contenders and may also have an impact on perception of the body and self – esteem. The aim of the study was to assess relationships between age, BMI, data concerning training, supplementation, self – assurance and body value among the contenders practising powerlifting.

51 people who regularly practise powerlifting: 11 women aged 23.5 ±3.6 and 40 men aged 23.9 ±8.5 have been examined using self – esteem (SES) and body – esteem (BES) questionnaires. Data concerning age, BMI, training variables and supplementation have been also gathered.

Supplementation is used by 91% of women and 85% of men. Men use more types of supplements than women ( $p < 0.05$ ). Among women SES does not correlate with any other variables. Among men SES negatively correlates with the number of used supplements, as well as with all of the BES domains.

Using supplementation among people who train powerlifting is rather common. Among women, SES is not related in any way with training or supplementation. Among men, lower self – esteem (SES) is significantly counterbalanced with BES.

**Key words** powerlifting, supplementation, body self – assessment

## Introduction

Modern competitive sport puts extreme demands to meet physical and mental requirements (Czaja, Lebedzińska, Marszall, Szefer, 2011), roperly selected training, regeneration after exertion, balanced diet as well as supplementation are the key determinants to achieve expected results in sports. Furthermore, it also determinates maintaining good health. This leads to the search for possible “reserves” in all aspects related to the functional

capabilities of the organism. This also applies to nutritional supplementation. Its purpose is to meet the energy needs and other nutrients that are consumed during high workloads (Kaczka, Tomaszewski, 2012). Completing the diet with supplements applies to a wide range of sports. It is crucial among sport disciplines, which are based on specialized strength training (Seidler, Sobczak, 2012; Cortese, 2014; Helms, Arago, Fitschen, 2014).

Taking up strength sports is inextricably linked with significant changes in people's physique, in particular – modelling figure. Silhouette modelling is one of the main motives why non – professionals decide to take up weight training without the desire of participating in any type of sport competitions (Kowal, Derkacz, Chmiel-Perzyńska, Mazur, 2010). It is also the one of the vital motives for practice among professional weight training contenders (Knapik, Horodecki, Jendrysik, Ziemianek, Rottermund, 2015).

Powerlifting is a typical strength sport, which includes three disciplines: squat with a barbell, bench press and deadlift. Powerlifters are characterized by powerful silhouette, gained through training and proper diet. Moreover, they practice intense weight training which requires properly formulated nutritional plan, which is almost always assisted by supplementation. This results in motor effects and morphological changes. Training and diet may be also associated with some psychological aspects, in particular concerning self – esteem and the value of the contenders' own body. The issue of assessing one's own body in the context of weight training has been already analysed from the perspective of occurring disorders (Pope, Katz, 1994; Mayville, Williamson, White, Netemeyer, Drab, 2002; Kropiwnicki, Rabe- Jabłońska, 2005; Hale, Diehl, Weaver, Briggs, 2013).

There are no empirical studies among powerlifters concerning supplementation from the non – pathological perspective. The research results presented in this study are the answer to the above mentioned issues (Choi, Pope, Olivardia, 2002; Rakfalska, Schier, 2008).

## Material and Methods

### Participants

The group of 51 contenders taking up powerlifting: 11 women (W) and 40 men (M) from the Upper Silesia (Southern Poland) has been examined. The research was anonymous and voluntary.

Study participants met selection criteria, which were based on powerlifting practice (regular training and taking part in competitions).

### Methods

The research was divided into sections. Used questionnaires included following components:

- morphological data: gender, age, height (cm), body weight (kg) and BMI (calculated on the basis of height and body weight),
- data related to training: training period (years), the average number of workouts per week, training duration (scale interval: 1: <30 minutes; 2: 30–60 minutes; 3: 60–90 minutes; 4: >90 minutes),
- questions related to diet supplementation (type, time and regularity of using supplements),
- BES scale – Body Esteem Scale: to examine the value of one's own body,
- SES scale – Self Esteem Scale: to examine one's self – esteem.

BES scale (Body Esteem Scale) consists of 35 questions related to self – assessment of appearance and body functions. Answers of the responder are expressed in points from 1 to 5, where 1 represents definite negative

feelings and 5 stands for definite positive feelings. Results are expressed in three categories for women and for men. However, two categories are different for women and for men. Common category (calculated differently for each gender) is Physical Condition: PC. Different categories are: Sexual Attractiveness: SA and Weight Concern: WC for women and Physical Attractiveness: PA and Upper Body Strength: UBS for men. The value of each category is the average of point answers to questions included in particular category (Franzoi, Shields, 1984; Franzoi, 1994).

The SES scale is a tool used for general self – report of self – esteem (Rosenberg, 1965). It includes ten statements. The task of the responder is to define to what extent they agree with statements in the questionnaire. There are four possibilities: “I definitely agree”, “I agree”, “I don’t agree”, “I definitely don’t agree”. Each response is scored. The total sum of points indicates the degree of overall self – esteem: the higher the score, the better self – esteem is. The total amount of the responses points in the SES scale was used for statistical calculations (Blascovich, Tomaka, 1991).

Statistical analysis included descriptive statistics in the form of following calculations: mean values,  $\pm 95\%$  CI, median, minimum values, maximum values and standard deviations. The reliability of the applied questionnaires (BES and SES) has been assessed by the Cronbach’s alpha coefficients – AC calculations.

Further analysis has been conducted by using non – parametric statistics. Differences between variables in groups have been calculated using the U Mann-Whitney test (UMW), while relationships between variables have been calculated using Spearman rank correlations. Statistical significance was assumed at  $p < 0.05$ .

The study has been approved by the Bioethics Committee of the Medical University of Silesia in Katowice, Resolution No. KNW/0022/KB1/42/1/11.

## Results

Descriptive statistics for analysed variables are presented in Table 1.

**Table 1.** Descriptive statistics for analysed variables and comparisons according to gender

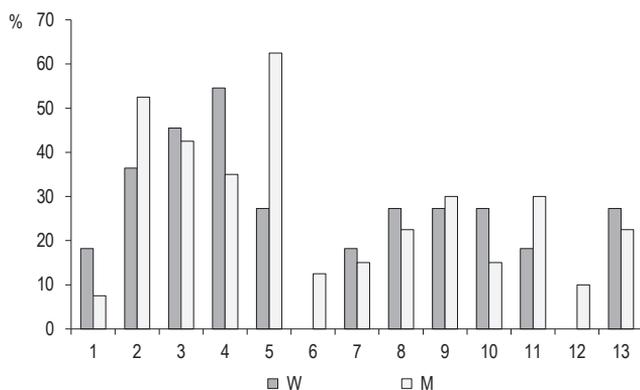
| Variable  | Gender | x(SD)        | 95%CI       | Min-max     | Me    | UM-W Test |         |
|---|--------|--------------|-------------|-------------|-------|-----------|---------|
|   |        |              |             |             |       | U         | P'      |
| 1   | 2      | 3            | 4           | 5           | 6     | 7         | 8       |
| Age (years)                                       | W      | 23.55 (3.59) | 21.13–25.96 | 18–30       | 23    | 184.0     | 0.5623  |
|   | M      | 23.95 (8.49) | 21.16–26.74 | 16–36       | 22    |           |         |
| BMI   | W      | 22.82 (3.39) | 20.54–25.11 | 18.34–28.27 | 21.72 | 72.0      | <0.0010 |
|   | M      | 28.14 (4.40) | 26.71–29.49 | 18.94–42.59 | 27.40 |           |         |
| Training period (years)                           | W      | 4.00 (3.32)  | 1.69–6.31   | 1.0–10.0    | 3.5   | 131.0     | 0.1668  |
|   | M      | 5.04 (3.97)  | 3.80–7.74   | 1.0–17.0    | 4.0   |           |         |
| Number of workouts per week                       | W      | 2.45 (0.52)  | 2.10–2.81   | 2–3         | 2     | 194.0     | 0.5563  |
|   | M      | 2.60 (0.59)  | 2.41–2.79   | 2–4         | 3     |           |         |
| Training time (h)                                 | W      | 3.18 (0.75)  | 2.68–3.69   | 2–4         | 3.0   | 152.5     | 0.1233  |
|   | M      | 3.62 (0.63)  | 3.36–3.79   | 2–4         | 4     |           |         |
| The number of supplements used regularly          | W      | 2.81 (2.48)  | 1.15–4.49   | 0–7         | 4     | 94.5      | <0.0100 |
|   | M      | 6.03 (3.25)  | 4.99–7.06   | 0–13        | 6     |           |         |
| The number of supplementation applied irregularly | W      | 2.18 (1.94)  | 0.88–3.49   | 0–7         | 2     | 210.0     | 0.8302  |
|   | M      | 2.63 (2.54)  | 1.81–3.44   | 0–8         | 2     |           |         |
| Total number of dietary supplements used          | W      | 5.00 (2.97)  | 3.01–6.99   | 0–10        | 5     | 90.5      | <0.0100 |
|   | M      | 8.65 (3.58)  | 7.51–9.79   | 0–13        | 10    |           |         |

|  | 1 | 2                                  | 3                            | 4                          | 5                      | 6            | 7     | 8      |
|--|---|------------------------------------|------------------------------|----------------------------|------------------------|--------------|-------|--------|
| Average time of using supplementation (months) |   | W 23.45 (23.11)<br>M 30.23 (36.39) | 23.45 (23.11)<br>17.73–42.73 | 7.93–38.98<br>1–180        | 3–72<br>12             | 12           | 192.5 | 0.0589 |
| SES  |   | W 18.00 (3.16)<br>M 19.88 (4.11)   | 18.00 (3.16)<br>19.88 (4.11) | 15.88–20.12<br>18.56–21.19 | 13–23<br>10–28         | 18<br>20     | 149.5 |        |
| BES: SA  |   | W 4.04 (0.49)                      | 4.04 (0.49)                  | 3.69–4.39                  | 3.31–4.84              | 4.00         |       |        |
| BES: WC  |   | W 3.69 (0.78)                      | 3.69 (0.78)                  | 3.14–4.24                  | 2.30–4.60              | 4.00         |       |        |
| BES: PC  |   | W 4.06 (0.66)<br>M 3.73 (0.79)     | 4.06 (0.66)<br>3.73 (0.79)   | 3.63–4.48<br>3.47–4.00     | 3.00–4.78<br>1.00–4.93 | 4.28<br>3.80 |       |        |
| BES: PA  |   | M 3.60 (0.81)                      | 3.60 (0.81)                  | 3.34–3.87                  | 1.00–4.82              | 3.45         |       |        |
| BES: UBS                                       |   | M 3.80 (0.83)                      | 3.80 (0.83)                  | 3.53–4.08                  | 1.00–4.78              | 3.89         |       |        |

\*Results with corrections for continuity.

Analysis of the reliability of used questionnaires revealed their sufficient internal cohesion. Cronbach's  $\alpha$  for SES was 0.739. Cronbach's scale  $\alpha$  for BES – SA was: 0.796; for BES – WC was: 0.891; for BES – PC was: 0.856 {W}, AC: 0.877 {M}; for BES – PA was: 0.918; and for BES – UBS was: 0.896.

Most of the respondents use supplements, it refers to 10 women (90.9%) and 34 men (85.0%). Applied types of supplements are presented in Figure 1.



Description: 1 – herbal supplements; 2 – amino – acids and their various forms; 3 – vitamins; 4 – minerals; 5 – creatine and its forms; 6 – testosterone boosters, antiestrogens; 7 – fat burners; 8 – others, e.g.: HMB, omega – 3 fatty acids, MCT, joints regenerators; 9 – carbohydrate nutrients; 10 – carbohydrate – protein nutrients; 11 – protein nutrients; 12 – food replacements, e.g. bars; 13 – isotonic drinks, hypertonics, energy drinks.

Figure 1. Types of used supplementation considering gender

Considering the fact that only one woman declared no supplementation, it was impossible to compare SES and BES – due to supplementation. Among men, after adopting the criteria of using supplements or not as an independent variable, comparison between SES and BES {UMW test} showed no statistically significant differences SES:  $p = 0.9853$ ; BES – PA:  $p = 0.0922$ , UBS:  $p = 0.3800$ , PC:  $p = 0.0922$ .

Subsequent steps of the analysis concerned relationships between training data, used supplementation, SES and BES. Correlation results related to gender are presented in Table 2.

**Table 2.** Correlations between data related to training, supplementation, SES and BES according to gender

| Variable                    | Gender | Supplementation                       |  |  |                                      |
|-----------------------------|--------|---------------------------------------|--|--|--------------------------------------|
|                             |        | average time of using supplementation | the number of supplements used regularly | the number of supplements used irregularly | the total number of used supplements |
| Training period             | W      | 0.294                                 | 0.201                                    | 0.019                                      | 0.071                                |
|                             | M      | 0.128                                 | 0.060                                    | -0.192                                     | -0.184                               |
| Number of training per week | W      | 0.030                                 | 0.384                                    | -0.059                                     | 0.145                                |
|                             | M      | 0.120                                 | 0.024                                    | -0.051                                     | 0.007                                |
| Duration of training unit   | W      | 0.211                                 | 0.010                                    | -0.196                                     | 0.047                                |
|                             | M      | -0.282                                | 0.106                                    | 0.320*                                     | 0.325*                               |
| SES                         | W      | -0.463                                | 0.329                                    | -0.479                                     | 0.129                                |
|                             | M      | 0.162                                 | -0.176                                   | -0.320*                                    | -0.321*                              |
| BES: SA                     | W      | 0.606                                 | -0.424                                   | 0.368                                      | -0.089                               |
| BES: WC                     | W      | 0.529                                 | 0.429                                    | 0.559                                      | 0.685*                               |
| BES: PC                     | W      | 0.354                                 | 0.127                                    | 0.368                                      | 0.300                                |
|                             | M      | 0.051                                 | 0.166                                    | 0.227                                      | 0.275                                |
| BES: PA                     | M      | -0.065                                | 0.240                                    | 0.207                                      | 0.333*                               |
| BES: UBS                    | M      | 0.056                                 | 0.220                                    | 0.211                                      | 0.295                                |

\* Significant correlation.

The results of calculated correlations between BES and SES seem to be interesting. These results did not reveal any dependence among women. Among men, all of three domains showed statistically significant differences: PC – SES:  $r = -0.503$ ; PA – SES:  $r = -0.564$ ; UBS – SES:  $r = -0.366$ .

## Discussion

Widely pursued marketing and its consequences in the form of socio – cultural changes, cause dynamic development of the industry of dietary supplements, which are often mistakenly referred to as “over – the – counter drugs” (Czaja et al., 2011). Supplements are used by various social groups, among people in different age. Motives of applying them are diversified but mostly related to health aspects. A peculiar group of supplements users are athletes. Among people who practice sports heavily, there is a strong belief that customarily used diet is not able to provide an adequate supply of nutrients. This may be the reason why supplementation has become almost the sole requirement for achieving success in sports (Seidler, Sobczak, 2012; Dymkowska-Malesa, Walczak, 2011; Lacerda, Gomes, Hortegal, Cabra, Veloso, 2015). This motive seems to find its confirmation in presented data rates and qualitative results of this study (Figure 1).

The prevalence of the use of supplements among athletes entails certain risks, which concern qualitative and quantitative aspects of their application. Mistakes resulting from insufficient knowledge in the usage of supplementation are usually made by athletes who practice endurance sports and weight training (Janiszewska, Przybyłowicz, Szyszko, 2012; Piliś, Michalski, 2014; Alsaeed, Alabkal, 2015). Poorly balanced diet, excessive

amounts of supplements, especially concerning substances rich in amino acids – these are the conclusions which have been emphasized by the researchers mentioned above. Diet mistakes have been also highlighted in the research of K. Janiszewska et al. (2012). Effectiveness of supplements available on the market has been extensively analyzed (Nissen, Sharp, 2003), as well as their quality, which has been also evaluated (Petroczi, Taylor, Naughton, 2011).

Research results presented in this study indicate that the predominant supplement used by men was creatine, whereas women preferred minerals (Figure 1). This seems to indicate a certain level of knowledge about supplements and gender as a variable differentiating the purpose of supplementation. It may be confirmed by gender differences in the type of used supplements, in the number of used supplements (Table 1) and in the fact that women do not use supplements 6 and 12 (Figure 1).

Self – esteem is considered as a primary element of welfare (Rosenberg, 1965). Majority of researchers (McAuley et al., 2005; Griffin, Kirby, 2007), despite the complexity of the problem (Hubbs, Doyle, Bowden, Doyle, 2012; Ziemianek, Jendrysik, Horodecki, Knapik, 2015), consider physical activity as beneficial for self – esteem. Analysis of average values and median of SES of the respondents (Table 1) may lead to conclusion that mutual relations between activities and SES are generally favourable. However, analysis of the results of the span (min–max) suggest caution in interpreting this view in terms of dogma. This gap is larger among men than among women.

Negative correlation of SES with the number of used supplements among men who use supplements may be also interesting, taking into account that there are no differences in SES – due to the use of supplementation. However, these relationships require further study in a larger group of people. The argument for the confirmation of the validity of such research could be for example a tendency to use anabolic steroids.

Furthermore, according to the authors, negative correlations between SES domains and BES among men (Table 2) are also important aspects of this study. The average values and median of BES are at adequate level – according to the adopted scale. Nevertheless, the gap in these results is quite large (Table 1). The lack of differences between people applying and not applying supplementation indicates that this variable has no effect on the level of BES. Yet, the statistical significance of BES and SES domains correlations amid men also proves interrelations.

Cross – sectional nature of this study does not allow the interpretation of these relationships in terms of a process. However, the lack of correlation between BES, SES and training variables appears to be consistent with the results presented by A. Hubbs et al. (2012). Moreover, it is also suggested that this problem should be considered in the aspects of training motives, as well as its effectiveness in terms of achieving success in sports.

## Conclusions

Cross – sectional nature of the study and the number of respondents unfortunately represent limitations of this study and require caution in drawing conclusions. Nevertheless, on the basis of these results some conclusions may be formulated.

The first one supports the view of the universality of supplementation among people professionally engaged in powerlifting.

The latter indicates a certain level of knowledge concerning expected results of supplements application – different for each gender.

Furthermore, gender is not a variable differentiating SES, whereas the relationship of SES and BES are disparate. Among women, there is no dependence, while among men dependences are negative and require further research.

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**Cite this article as:** Knapik, A., Gallert-Kopyto, W., Jendrysik, K., Ziemianek, P., Horodecki, M., Myśliwiec, A. (2019). The Use of Supplementation Among People Practicing Powerlifting and its Connections with their Self – esteem and Body Value. *Central European Journal of Sport Sciences and Medicine*, 1 (25), 35–42. DOI: 10.18276/cej.2019.1-04.