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PHYSICAL ACTIVITY LEVEL AND HEALTH-RELATED QUALITY OF LIFE (HRQOL) IN AMATEUR TENNIS PLAYERS. COMPREHENSIVE EVALUATION OF FACTORS AND COMPONENTS OF SUBJECTIVE SELF-ASSESSMENT OF HEALTH

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SUMMARY

Introduction: Physical recreation is an active form of leisure time spending. The rapid development of science and technology, which has been made over the last few decades, and the following as a result of changes in circumstances and ways of people life caused that growing number of people are deciding for sedentary form of free-time spending. Regular physical activity is regarded not only as one of the key factors of health prevention, but also allows to the proper functioning of the body in physically and mentally dimension.

The purpose of this study: was to evaluate the level of physical activity of amateur tennis and the level of their quality of life compared to people not engaged in sports activities. It was also examined whether the level of physical activity, age and BMI affect different dimensions and components of health in both groups.

Material and methods: The study involved 81 men aged 18-62 years (M=46,24; SD=10,43) - participants of amateur tennis tournaments. The control group consisted of 108 men aged 23-57 years (M=39,76; SD=7,98), who do not take any physical activities in the past and have no any somatic diseases. The study used sociometric techniques complemented by the own designed author's questionnaire. The level of sport activity was determined using a HPA (Habitual Physical Activity) questionnaire, while health self-assessment using a SF-36 (Short Form Health Survey) questionnaire.

Results: Significantly higher self-assessment of health was noted in the tennis sample – compared to the control group. Positive correlations between sport index ang global HPA index with factors and components of health were reported. In case of control group, relationships were weaker and additionally concern impact of work index to mental component of health and mental factors. In both group, association between age and BMI index with health self-assessment was no found.
Conclusions: Regular physical activity has a positive effect on physical and mental functioning of the body. Age and BMI did not show a connection with dimensions and components of health.
Keywords: physical activity, self-assessment of health, quality of life, tennis.

STRESZCZENIE

Wstęp: Rekreacja ruchowa jest formą aktywnego spędzania wolnego czasu. Szybki rozwój nauki i techniki, który dokonał się na przestrzeni ostatnich kilkudziesięciu lat, oraz następujące w wyniku tego zmiany warunków i sposobów życia ludzi spowodowały, iż coraz więcej osób decyduje się na sedenteryjny tryb wypoczynku. Systematyczna aktywność fizyczna, uważana jest nie tylko jako jeden z kluczowych czynników profilaktyki zdrowia, lecz pozwala również na prawidłowe funkcjonowanie organizmu w wymiarze fizycznym oraz psychicznym.
Cel pracy: Celem pracy była ocena poziomu aktywności fizycznej osób amatorsko uprawiających tenis ziemny oraz określenie poziomu ich jakości życia w porównaniu do osób nie prowadzących aktywności sportowej. Zbadano także czy poziom aktywności fizycznej, wiek oraz wartość wskaźnika BMI wpływają na poszczególne wymiary i komponenty zdrowia w obu grupach.
Materiał i metody: Badaniem objęto 81 mężczyzn w wieku 18-62 lat (M=46,24; SD=10,43) – uczestników amatorskich turniejów tenisowych. Grupę kontrolną stanowiło 108 mężczyzn w wieku 23-57 lat (M=39,76; SD=7,98), nie prowadzących żadnej aktywności fizycznej oraz nie leczących się na żadną chorobę somatyczną. W badaniu wykorzystano techniki socjometryczne uzupełnione o autorską metryczkę. Poziom aktywności sportowej określono za pomocą kwestionariusza HPA (*Habitual Physical Activity*) natomiast samoocenę zdrowia za pomocą kwestionariusza SF-36 *(Short Form Health Survey).*
Wyniki: Odnotowano istotnie statystycznie wyższą samoocenę samoocenę zdrowia w grupie badanej – w porównaniu z grupą kontrolną. Zaobserwowano dodatnią korelacje między wskaźnikiem sportu i ogólnym wskaźnikiem HPA a czynnikami i komponentami zdrowia wśród mężczyzn uprawiających sport. W odniesieniu do grupy kontrolnej, odnotowano negatywną zależność między wysiłkiem fizycznym w pracy a psychicznym komponentem zdrowia i tworzącymi go czynnikami. W obu grupach, wiek i wartości wskaźnika BMI nie korelują ani z samooceną zdrowia ani z aktywnością fizyczną.
Wnioski: Systematyczna aktywność fizyczna pozytywnie wpływa na funkcjonowanie fizyczne i

psychiczne organizmu. Wiek oraz wartości wskaźnika BMI nie wykazują związku z wymiarami i komponentami zdrowia.
Słowa kluczowe: aktywność fizyczna, samoocena zdrowia, jakość życia, tenis ziemny.

INTRODUCTION

Participation in physical activity (PA) plays an important role for physical and mental health. Regularly engaging in moderate and/or vigorous physical activity has been shown to reduce the risk of all-cause mortality, cardiovascular mortality, cancer mortality, stroke, heart disease, dementia, depression, diabetes, other undesirable health outcomes and is associated with a lower risk of degenerative joint disease [1-7]. Recent meta-analyses and systematic reviews confirms that PA also enhances quality of life [8-9].

Tennis is a kind of activity that is characterised by prolonged durations of repeated, high-intensity bouts interspersed with standardised rest periods, and is pronounced as physically and physiologically demanding [10]. Several studies have demonstrated a health benefit not only in tennis players who have played all their lives, but also in those who only start to play as adults, with substantial health benefits on older players (i.e., greater aerobic capacity, reduced percentage of fat, more favourable lipid profile) [11-13]. However, many studies have focused on measuring the physical demands of high-level tennis players. Surprisingly there is little research on impact of PA to QoL among amateur tennis players. This study examines both self-reported physical activity level and quality of life status in this group, and compares results with control group which not take any exercise.

MATERIAL AND METHODS

To investigate whether higher levels of physical activity is positively associated with better health-related quality of life, 81 males - amateur tennis players were qualified to participate in this study. The mean age was 46,24; SD=10,43; range: 18-62 years. It were the players participating in ATP (amateur tennis Polish) tournaments under the aegis of the Polish tennis Association. Research was carried out at the time of the ATP tournaments in Krakow, Chorzow, Bytom and Olkusz. The control group consists of 108 males in age of 23-57 years (mean=39,76; SD=7,98) who do not take any physical activities in the past (excluding participation in physical education lessons) and have no any somatic diseases. All participants voluntarily took part in this study and filled out a paper-and-pencil version of surveys.

Baecke Habitual Physical Activity (HPA) questionnaire evaluates the average PA level of an individual. It is made-up of 16 closed questions classified into three domains: (1) „work", (2) „sport" and (3) „non-sports leisure". Each domain has several questions scored on a Likert scale

(from 1 to 5), ranging from never to always or very often. „Work" was the mean score among eight occupational questions, „sport" was the mean score among four sports-related questions, and „non-sports leisure" was the mean score among four habitual physical activities during leisure time. The fourth index assesses the global PA level and is in fact the sum of the three previous indexes (on a scale from 3 to 15) [14].

The SF-36v2 Health Survey asks 36 questions to measure functional health and well-being from the subject's point of view. It is a practical, reliable and valid measure of physical and mental health. The eight domains that the SF36 measures are as follows: physical functioning; role limitations due to physical health; role limitations due to emotional problems; energy/fatigue; emotional well-being; social functioning; pain; general health. Eight domains of is grouped into two dimensions: the physical component summary (PCS) and the mental component summary (MCS). Each of 36- item is scored from 0 to 100, with 0 is equivalent to maximum disability and a score of 100 is equivalent to no disability. The lower the score the more disability. and conversely the higher the score the less disability [15,16].

Statistical analysis was performed by means of STATISTICA StatSoft (Version 10.0 for Windows) To estimate normality the Shapiro-Wilk test was used. Differences between groups were examined using Mann-Whitney U test and ANOVA (Analysis of Variance). Differences between means were rated significant at $P < 0,05$.

RESULTS

Of the 81 respondents, 30 subjects (%) practiced tennis professionally in the past (turned pro: mean=5,11; SD=3,26; MIN-MAX: 1-10 years). 87% of players, playing tennis throughout the year. The remaining (13%) playing at least 7 months of the year.

Table 1 and Table 2 presents descriptive data of physical activity level and health-related quality of life for the subjects as well as comparison between the tennis group and control group in the analyzed variables.

Table 1. Baecke HPA: Physical activity – descriptive statistics

Domains of PA	**Mean ± SD**		**p**
	Tennis group	**Control group**	
work	2,96 ± 0,86	2,02 ± 0,97	**0,0067**
sport	4,26 ± 0,57	1,96 ± 0,86	**0,0000**
non-sports leisure	3,05 ± 0,48	2,44 ± 1,15	**0,0313**
Global HPA index	10,27 ± 1,94	6,42 ± 1,59	**0,0000**

Table 2. SF-36: Health self-assessment – descriptive statistics

Health components and factors	Mean ± SD		p
	Tennis group	Control group	
physical functioning	92,44 ± 14,81	79,42 ± 18,46	**0,0006***
role limitations due to physical health	86,77 ± 16,22	76,82 ± 19,24	**0,0086***
pain	81,46 ± 15,79	73,57 ± 15,81	**0,0212***
general health	80,57 ± 16,11	74,32 ± 15,97	**0,0368***
Physical Component of health [PH]	84,06 ± 18,72	76,04 ± 15,86	**0,0201***
emotional well-being	90,23 ± 13,54	81,64 ± 16,07	**0,0175***
energy / fatigue	79,64 ± 12,61	71,83 ± 13,99	**0,0377***
role limitations due to emotional problems	87,94 ± 15,35	77,59 ± 14,56	**0,0190***
social functioning	85,49 ± 14,29	81,95 ± 15,47	0,1964
Mental Component of health[MC]	83,82 ± 15,05	78,25 ± 16,88	**0,0485***

Note: *statistically significant differences

In tennis group, correlational analysis revealed a significant strong and moderate relationship between sport index and global HPA index with all of SF-36 health components and factors ($0,33<r<0,59$; $0,001<p<0,02$). In case of control group, correlations were weaker and concern impact of sport index and global HPA to pain ($r=0,22$; $p<0,05$), general health ($r=0,18$; $p<0,05$) and emotional well-being ($r=0,15$; $p<0,05$). Additionally, work index was negatively associated with mental component ($r=-0,37$; $p<0,01$) and factors of mental health ($-0,26<r<-0,41$; $0,01<p<0,05$).

Table 3 shows differences in baseline values of health components and factors of SF-36 between tennis players who played professional tennis in past (now are playing amateur) and who have been playing only amateur (in past and today).

Table 3. SF-36: comparison between professional and amateur players

Health components and factors	Mean ± SD		p
	Professional in past	Only amateur	
physical functioning	91,46 ± 17,64	93,22 ± 16,86	0,7645
role limitations due to physical health	87,21 ± 15,29	85,96 ± 16,84	0,7491
pain	78,19 ± 16,03	83,58 ± 17,23	**0,0423***

general health	73,67 ± 16,55	82,24 ± 17,15	**0,0112***
Physical Component of health [PC]	82,63 ± 16,92	86,25 ± 16,96	0,1236
emotional well-being	91,65 ± 17,47	90,02 ± 18,99	0,8896
energy / fatigue	77,54 ± 16,67	80,66 ± 17,45	0,1052
role limitations due to emotional problems	88,49 ± 18,41	86,29 ± 17,20	0,7996
social functioning	85,11 ± 16,76	87,87 ± 18,12	0,8077
Mental Component of health[MC]	85,69 ± 16,22	86,21 ± 17,56	0,8479

Note: *statistically significant differences

In table 4, differences in health self-assessment due to physical activity levels in tennis group were presented. Relationship: higher level of PA - better HRQoL was demonstrated.

Table 4. SF-36: differences in health self-assessment due to physical activity levels in tennis group

Health components and factors	Work index	Sport index	Non-sport index	Global HPA index
physical functioning	0,5644	**0,0137***	**0,0398***	**0,0064***
role limitations due to physical health	0,3535	**0,0122***	0,0879	**0,0057***
pain	0,2974	**0,0156***	0,2891	**0,0101***
general health	**0,0367***	**0,0216***	**0,0417***	**0,0174***
Physical Component of health [PH]	0,0666	**0,0013***	**0,0456***	**0,0008***
emotional well-being	0,1306	**0,0003***	**0,0033***	**0,0000***
energy / fatigue	0,4155	**0,0019***	**0,0219***	**0,0027***
role limitations due to emotional problems	**0,0479***	**0,0045***	0,1785	**0,0036***
social functioning	0,0599	**0,0111***	0,3699	**0,0091***
Mental Component of health[MC]	0,1289	**0,0004***	**0,0414***	**0,0000***

Note: *statistically significant differences

In last step, differentation of HRQoL and PA level due to age, BMI and education level were performed. However, there were no significant differences in analysis data in both groups.

DISCUSSION

Successful aging is multidimensional, encompassing the avoidance of disease and disability, the maintenance of high physical and cognitive function, and sustained engagement in social and productive activities [17,18]. It is widely known that participation in physical activity has significant positive effects on improving and maintaining mental health, preventing and minimizing effects of chronic diseases, as well as enhancing physical health and function. While, the most of studies have focused on overall daily physical activities and its effect to HRQoL, this work was directly designed to investigate this topic in specific discipline, such as tennis.

One of the most used definition of physical activity say, that it is any bodily movement produced by skeletal muscles that result in energy expenditure [19]. Take into consideration this notion, in the present study decided to use the Habitual Physical Activity (HPA) questionnaire which allows to assess physical activity level in three categories: occupational (work) activity, sports and non-sport (leisure free-time) activities. Analysis of data presented in table 1, show to significant differences between study group and control group in all of physical activity domains. The highest and the lowest mean values were noted in sport domain, respectively in tennis group and control group. As for QoL (table 2), the results analysis of the two groups shows significant differences in favour of tennis samples with respect to control group regarding all components and health factors (excluding factor: social functioning). In the control samples, slightly higher values in the mental component - compared to physical component are noteworthy.

The division due to kind of sport participants, allowed for comparisons between the two different groups of tennis players (table 3). Statistically significant differences were observed in factors: „pain" and „general-health". Comparing the groups in first mentioned factor, the greater mean value was noted in professionals players. Perhaps its a results that the professionals participate at a harder and more intense standard of play than amateur competitors. Therefore, it seems that they are more resistant to pain or have a higher pain threshold. On the other hand, differences in components of health were no found and average results were at similar level.

In summary, the results of the study confirm previous empirical data and support hypothesis that maintain of optimal or increase of physical activity level would shape a health-related quality of life.

CONCLUSIONS

The findings QoL and the PA-QoL relationship presented here, suggest that PA contribute to better QoL. However, excessive dose (training load) of physical activity can cause a decrease of some health factors.

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