

Psychophysical health and perception of well-being between master badminton athletes and the adult Italian population

Giuseppe Lassandro^{1,5,6}, Rodrigo Trisciuzzi^{2,3}, Valentina Palladino¹, Francesco Carriero¹, Orazio Valerio Giannico¹, Silvio Tafuri¹, Roberto Valente⁴, Antonio Gianfelici⁵, Domenico Accettura⁶, Paola Giordano¹

¹University of Bari “Aldo Moro”, Department of Biomedical Science and Human Oncology; ²Department of Emergencies and Organ Transplantation (DETO), University of Bari “Aldo Moro”, Bari, Italy; ³Ph.D Course of transplantation of tissue and organs and cell therapy (DETO, University of Bari “Aldo Moro”, Bari, Italy); ⁴Department of Biomedicine and Human Oncology (D.I.M.O.) – Pediatric Unit – University of Bari “Aldo Moro”; ⁵Italian Badminton Federation, Medical Commission; ⁶Italian Sport Medicine Federation, Bari Medical Association

Abstract. *Background and aim of the work:* Sport participation, regular exercise and physical activity in general exert many benefits on wellness, perceived health related quality of life and social satisfaction. As the people age, physical and mental deterioration occur. Master athletes are older adults that practice different sports, such as running, swimming and badminton. This is a widespread sport practiced by over 200 million people and is one of the most exerted sport in the world. In our study we compared the health perception of Italian Badminton Master athletes and normal Italian population of same age. *Methods:* Thirty (22 males, 8 females) Master badminton athletes between 18 and 69 years old participating to 2018 edition of the Italian Master Badminton Championship were enrolled for the study. All athletes compiled a six questions questionnaire, about perceived quality of life, included in the 2014-2017 Italian surveillance database “PASSI” questionnaire and answers were compared to 18-69 y/o Italian population results included in the public database. *Results:* Statistically significant differences were not detected between genders of master athletes. There was only a significant better psychological perception of quality of life in younger class of master athletes ($p < 0.05$). A significant better perception was detected in Master athletes compared to normal Italian population. *Conclusions:* Aerobic sports, such as badminton, represent positive factors for improving health, psychological wellness and social engagement. Sport has a crucial role for the positive influence on growth in youngers and on the preventive role on typical diseases of older age, such as diabetes, ischemic cardiomyopathy and mental illness. (www.actabiomedica.it)

Keywords: Wellness, health related quality of life, sport, old adults.

Introduction

Sport participation has innumerable health benefits in all age groups. It is widely proved that the development of several chronic-degenerative diseases related to the older age, as metabolic and cardiovascular disorders, can be limited through a regular physical

activity (1,2). Frequent physical exercise reduces the incidence of heart disease, disability and mortality, but it could also be the cause of adverse clinical events, such as myocardial infarction or sudden death (3-6). Furthermore, histologic composition of muscle fibers is highly influenced by aging, increasing hybrid fibers distribution and reducing strength. Regular exercise in

older age, could contribute in deposition and preserve the amount of high-performance fibers (Myosin Heavy Chain, MHC fibers) (7). Physical activity and sport develop undoubted benefits on young people as it is a fundamental factor for their future metabolic health during adulthood, i.e. develop a significant delay in the development of osteoporosis during growth (8). Moreover, sport produces long-lasting effects on psychological health, improving social engagement and plays a crucial role in the treatment of high deteriorating mental illness such as depression or anxiety (9-11). It is acknowledged that holding a highly competitive level training program during older age, reduces age-related health decline (12), i.e. handles diabetes mellitus type 2, slows down arterial stiffness and controls osteoarthritis associated pain (13). Although a recent survey conducted by Eime et al., showed that less than 10% of people involved in sport participation are older adults (14), it is demonstrated that regular physical activity into older age is an effective means to improve quality of life, psycho-physical well-being (15-17), develop and keep community engagement and improve social connections (18). For the physiological, preventive, well-ness and psychological positive implications about practicing sport, a study conducted in 2017, showed that holding a competitive sport regimen even in older age as Master athletes, could be a model of preventive medicine (19). Master athletes, defined as individuals who systematically train in organized forms of competitive sports specifically designed for older adults (20), are subjects from the ages of 35-40 years, participating in competitions organized by the national Sports Federations. They exhibit heterogeneous characteristics: individuals who have practiced sports for a long time, retired athletes who start practicing sports again, or typically sedentary people who decide to start a sporting experience in old age (42). The regular participation in sport activities should be encouraged more as a means of preventing the diseases typical of old age than for aspects related to sports competition. It has been demonstrated that several sports, such as golf (21), cycling (22), swimming (23) can improve cognitive function and well-being in older adults. Badminton is a racket sport based on single or double matches, structured in short and high intensity actions. Originating in ancient Chinese culture, it

now represents the national sport of numerous Asian countries (24). In 1992 badminton was included in the Olympics Games. Subsequently, a constant increase in sport participation were recorded.

To date, badminton is a globally widespread sport with over 200 million players (25). It is a common affordable sport regardless of age or experience for its unique features (absence of physical contact, light and cheap tools, limited field sizes with the possibility of indoor practice) (26,27) and physiological patterns because is a continuous alternation of aerobic exercise (28) and longer moderate duration range of exercise (aerobic system) (29). However, badminton develops a high energy demand from alactic anerobic system generally at competitive levels providing maximum level of energy required during matches (30). For noncompetitive players and untrained population, badminton could be considered a strategy to improving the health and well-being (31). The aim of our research was to compare indicators of well-being perception and health among badminton master athletes and the adult Italian population through "PASSI" surveillance system. It is an adult specific life-style surveillance system of the Italian National Institute of Health (*Istituto Superiore Di Sanità*, Roma, Italy) launched in 2006 with the aim of monitoring the health status of the Italian adult population (18-69 years). "PASSI" surveillance system collects data on lifestyles, health-risk behaviors and chronic diseases from the adult Italian population. Its main topics investigated are physical activity, overweight and obesity and psycho-physical well-being connected to health (32).

Material and Methods

We enrolled 30 Master badminton athletes between 18 and 69 years old participating to 2018 edition of the Italian Master Badminton Championship and compared to adult population aged 18-69 years from national data obtained from PASSI surveillance database 2014-2017. A 6 questions questionnaire were administered to Master athletes and results compared to answer obtained by national database available on Italian National Institute of Health website (Table. 1). Written informed consent was obtained from eligible

Table 1. Questions administered in anonymous questionnaire to Master athletes in common with PASSI surveillance surveys.

a. Considering your physical health, including illness and the consequences of accidents, in the last 30 days, how many days did you not feel well?
b. Thinking about the psychological aspects, like emotional problems, anxiety, depression, stress, in the last 30 days for how many days did you not feel well?
c. Over the past 30 days, for how many days a week you have had intense physical activity which causes a large increase in breathing and heartbeat or heavy sweating, such as running, cycling?
d. These days for how many minutes on average?
Physically active
e. In the last 30 days did you use a bicycle to go to work or school, or for regular trips, excluding sports-competitive activities?
f. What kind of benefits do you perceive when you are practicing physical activity?
I feel less tense and stressed
I breath better
I sleep better
I am looser in my movements

subjects who wished to participate in the study. This study was approved by the Medical Ethics Committee of Azienda Ospedaliero Universitaria Consorzionale Policlinico-Giovanni XXIII in Bari, Italy

Statistical analysis was performed using R version 3.5.1 (released on 2018-07-02). Continuous variables were reported as mean $\pm$ SD and compared through t-test with Welch correction, in order to account for heteroscedasticity, evaluated through Bartlett test. Normality assumption was checked through Shapiro Wilk test. Categorical variables are reported as absolute and relative frequencies and compared through Fisher Exact test, in order to account for small sample size ($n=30$). Pearson correlation was performed in order to analyse relationship between continuous variables. A descriptive comparison with data from PASSI Study 2014-17 was performed as well. Statistical significance α was fixed to 0.05.

Results

Baseline characteristics of patients, answers obtained by study group and data from Passi Italia 2014/2017 were all reported in Table 2.

Except for question B (Thinking about the psychological aspects, like emotional problems, anxiety, depression, stress, in the last 30 days for how many days did you not feel well?) between age classes ($p < 0.05$),

there are not significant differences between sexes and age classes, meaning that gender in our sample is not a factor that influence the perception of wellness or capable to worsen or improve health perception in master athletes ($p > 0.05$; Table 3).

Results of Pearson correlation between continuous variables are not significant as well ($p > 0.05$; Table 4).

From comparison with PASSI 2014-17 (Table 3) it emerged that Badminton athletes have a better health perception, both physically and psychologically, as well as they are more physically active, and these findings are constant between sexes. As well as genders, from the comparison of answers between age classes of study groups to question A (Considering your physical health, including illness and the consequences of accidents, in the last 30 days, how many days did you not feel well?) and question B, it emerged a statistically significant difference ($p < 0.05$) in perception of well-being and psychological wellness (Table 3).

Discussion

This study investigated the wellness of two groups of people through administration of a questionnaire "PASSI", used by Italian National Institute of Health. It is possible to highlight that Master badminton players showed better outcome in their perception of

Table 2. Characteristics of respondents and answers. Data are n (%) or mean ($\pm$ SD).

	<i>n=30</i>
Age	52.7 (8.5)
35-49	8 (26.7)
50-69	22 (73.3)
Female sex	8 (26.7)
BMI	24.2 (2.6)
a. Considering your physical health, including illness and the consequences of accidents, in the last 30 days, how many days did you not feel well?	0.8 (1.5)
b. Thinking about the psychological aspects, like emotional problems, anxiety, depression, stress, in the last 30 days for how many days did you not feel well?	1.3 (3.0)
c. Over the past 30 days, for how many days a week you have had intense physical activity which causes a large increase in breathing and heartbeat or heavy sweating, such as running, cycling?	3.2 (1.7)
d. These days for how many minutes on average?	95.7 (43.8)
Physically active*	19 (63.3)
e. In the last 30 days did you use a bicycle to go to work or school, or for regular trips, excluding sports-competitive activities?	11 (36.7)
f. What kind of benefits do you perceive when you are practicing physical activity?	
I feel less tense and stressed	10 (33.3)
I breath better	1 (3.3)
I sleep better	2 (6.7)
I am more loose in my movements	17 (56.7)

*30 minutes of moderate activity for at least 5 days a week, and / or intense activity for more than 20 minutes for at least 3 days a week.

health and better wellness indices. Nonetheless, there is no difference between males and females within the Master group, reinforcing the concept that aerobic sport, such as badminton, should play a crucial role on positively influencing both physical and psychological profiles of old adults independently by the gender. Our results suggest that sport participation has probably a positive influence on a wide range of people and on the perception of life quality.

Physical wellness and physical aging

Physical activity and exercise are acknowledged as factors that positively influence health on every age range. Both represent key points in consuming energy to contrast inactivity and sedentary attitude and decrease adverse effect of the aging process (33). Leaving aside the type of activity (competitive or non-competitive), a clinical visit by the sports doctor or the attending physician is always necessary (34).

Aerobic exercise, as the one performed during badminton matches, aids to prevent cardiac and pulmonary functional deterioration and long-term exercise, i.e. running, represents a positive factor in preventing muscles function (35) and counteract sarcopenia (36), limiting the progressive atrophy of fast contracting fibres (Type II) (37) and osteoporosis (46). However, the intense physical activity that Master athletes carry out might predispose to pathologies secondary to intense physical effort such as for example the increase in the incidence of supraventricular extrasystoles which can be the direct consequence of the cardiac hypertrophy of these athletes (47). Nevertheless, has been shown that, although master athletes perform physical activity with better results, deterioration of cardiopulmonary well-ness develops faster than sedentary people (35). Aging process includes even the worsening of cognitive field. It represents an important aspect of the process, involving many people, as the composition of cerebral fibres declines aging due to

Table 3. a) Characteristics of respondents and answers by sex. Data are n (%) or mean ($\pm$ SD), p values are from Fisher Exact test and Welch t-test; b) Characteristics of respondents and answers by age. Data are n (%) or mean ($\pm$ SD), p values are from Fisher Exact test and Welch t-test; c) Comparison of study group (Badminton sample) with regional data (Passi Italia 2014/2017); d) Characteristics of respondents (Badminton sample and Passi Italia 2014/2017) and answers by sex; e) Characteristics of respondents and answers by age classes.

[illegible]

Table 4. Results of Pearson correlation for continuous variables

<i>Variable 1</i>	<i>Variable 2</i>	<i>Coeff.</i>	<i>p value</i>
Age	Question a.	-0.20	0.301
Age	Question b.	0.10	0.602
Age	Question c.	-0.15	0.434
Age	Question d.	-0.03	0.860
BMI	Question a.	-0.07	0.720
BMI	Question b.	-0.08	0.678
BMI	Question c.	-0.26	0.165
BMI	Question d.	0.19	0.313
Question a.	Question b.	-0.20	0.282
Question a.	Question c.	-0.01	0.978
Question a.	Question d.	0.03	0.890
Question b.	Question c.	0.06	0.767
Question b.	Question d.	0.10	0.616
Question c.	Question d.	-0.07	0.709

reduced vascularization and increased amount of oxygen agents (34). Supporting this concept, Nilsson et al., detected a higher cognitive level, in a group of old people after completing a multidomain session of mental and physical exercises, coupled to a higher level of a neurotrophin, the Brain Derived Neurotrophic factor (38). Recent consensus about physical activity on older adults showed, in 2019, its consequences on well-being, cardiorespiratory wellness, cognitive and psychological profile in terms of depression, motivation and social engagement. Have been stated four crucial aspects of physical activity on aging. First, is highlighted the close relationship between functional capacity and health, focusing that during old age, sport and physical activity in general have a positive role in maintaining and handling health and physiological processes. Secondly, cognitive field is deeply influenced by physical activities based on duration and exercises plan. Thirdly and lastly, self-efficacy is consistently associated with physical activity for older adults and involvement in activity aggregation events, i.e. sport competitions, represents a positive factor for the social engagement (39). As shown in our study, Master athletes displayed better wellness perception of their lives. Furthermore, Gallè et al. proved that older people undergone an organized physical activity, improved their health status perception (40). However, Martin et al., comparing people

aged between 50-74 and 75-99 years, detected lower satisfaction, lower self-esteem and lower mental plasticity in younger group and better cognitive profile and fewer concerns in the older one (41). Further, has been shown that perception of wellbeing is more associated to physical activity in older adults than in younger leading to a better perceived health related quality of life (42). It is commonly assumed that sport is a recreational and functional tool for children and young adults. However, some kinds of sport are recognized as appropriate for older adults, low contact and aerobic sports such as tennis, cricket and, as showed in this study, badminton. Additional data from Claire et al., suggest that involvement in physical activity of older adults could enhance the quality of intergenerational opportunities, role modelling and personal safety (43). Global population is progressively aging, but many stereotypes are deeply radicated in the common sense about old people. Nowadays, elderly people represent a heterogeneous population category keeping the concept that physical and mental skills of those adults are frequently quite similar to young adults. The WHO (World Health Organization) suggests the change of the point of view of the health system globally, fostering an older person centred and integrated care (44). Our work points to focus individual perception of wellness on Master badminton players and highlighted that physical activity constantly conducted over time, such as those athletes do, provides sensible benefits on social health and on health-related quality of life.

Moreover, Master athletes did not show significant gender differences about perceived mental and physical health. However, age groups are limited to a range between 35 and 69 years and further studies should focus on an older population in order to summarize the influence of physical activity on their health-related quality of life during more advances stages of age. Future studies are necessary focusing on other sports and expanding the analysis on a higher number of Master athletes to spread results about perceived health.

Conclusion

This study represents the first retrospective study that compares the perception of health-related quality

of life between badminton Master athletes and normal population in Italy and represents an important tool to gain more awareness about influence of physical activity on the wellness consciousness. Sports participation represents a correct approach to a constantly increasing mean age of the global population (45) and the adoption of a healthy habits as physical activity, could help to handle a normal biological deterioration process. Aging is not only a physical process, but even psychological and mental illness due to older age is physiological and holding an active lifestyle could delay the evolution of cognitive properties impairment and improve social engagement.

Conflicts of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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Correspondence:

Received: 17 May 2020

Accepted: 31 August 2021

Giuseppe Lassandro

University of Bari "Aldo Moro",

Department of Biomedical Science and Human Oncology;

Phone: +39 0805592950

E-mail: giuseppelassandro@live.com