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Research Article

Female Fitness Members: Meaningful Targets for Psycho-somatic and Behavioural Investigation

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Abstract

Purpose: Purpose of the study was to assess psycho-somatic condition in fitness club members including depending on age, cultural diversity and duration of fitness training.

Subjects: Russian Group included 148 novice, aged from 18 to 63 years and 36 long-term (i.e., involved into fitness training for 2 years) aged from 24 to 66 years female members of the urban fitness facility. Canadian Group included 100 females, aged from 19 to 71 years. The study groups were additionally stratified into younger (<50 years) and older (>50 years) subgroups.

Methods: All participants were interviewed; Anthropometric measures and Aerobic Sub-maximal Stress-test were performed. Russian Group persons were additionally screened using Visual Analogue Scale, Hospital Anxiety and Depression Scale, E.Heim's coping inventory.

Results: Female members of the diverse urban fitness facilities could not be positioned as mainly sound persons due to presumable arterial hypertension, locomotive problems; predominantly increased weight; prevalence of anxiety, depression.

Conclusion: The obtained data confirm the necessity of accurately designed psycho-somatic assessment of female fitness-clients.

Unhealthy body weight was registered in all novice female exercisers. Only 33% of Russian novice fitness members aimed at weight loss *vs* 38% of registered overweight and obese persons. The sustained fitness training for 2 years helped to maintain normal range of BMI in females aged <50 years, but not in members aged >50 years. Thus, weight loss strategy requires special analyzes and modification in female fitness members of all ages, and the mentioned cohort could be considered as a target group for further lifestyle changing and counselling.

In comparison to Russian novice female fitness members, Canadian exercisers demonstrated higher aerobic fitness level, more intention to enhance somatic well-being, reported less health problems, less often noted positive emotions and mood improvement as the preferred training goal than Russian females. Russian novice exercisers were more dissatisfied with their appearance, than Canadian fitness members.

In Russian novice female fitness members aged <50 years anxiety and depression were screened in 23% and 3.6% cases, respectively. It makes the cohort of fitness exercisers a target group for accurate mental health assessment. Compared to novice exercisers, Russian females involved into sustained fitness training demonstrated more adherence to healthy lifestyle, better somatic condition and aerobic fitness; absence of exercise-induced hypertension; normal levels of depression and anxiety. Negative changes in coping strategies, and pronounced need in positive emotions make long-term female fitness members a target group for psycho-somatic assessment and possible specific intervention.

Keywords

Anthropometric Measures; Anxiety; Depression; Female Fitness Members; Fitness Training

Abbreviations

BFP	:	Body Fat Percentage
BMI	:	Body Mass Index
CG	:	Canadian Group
HADS	:	Hospital Anxiety and Depression Scale
RG	:	Russian Group
RGn	:	Novice RG cohort
RGl	:	long-term training RG cohort
VAS	:	Visual Analogue Scale

Introduction

The available evidence shows physical activity as the main strategy of healthy lifestyle, all-cause mortality risk reducing factor, and a natural way of non-infective chronic disease prevention and management. US Department of Health and Human Services and European Society of Cardiology advise to both men and women of all ages aerobic and resistance based regular training to improve their cardiovascular fitness, muscle strength, and bone mineral density, to obtain healthy weight and body composition. Physical activity has also a positive effect on arterial hypertension, diabetes, hyperlipidemia, obesity, and mental well-being [1-3].

Motivated urban individuals may increase their physical activity in fitness facilities. Eg: about 21% Swedes, 19% Americans, 3% Russians are current adult fitness members. Fitness exercisers, on the average, may spend up to several hours 2-3 and more times per week in the prevalent fitness facility [4-7], that corresponds and sometimes even exceeds the level of beneficial physical activity, recommended by health organizations [1]. That is why fitness clients could be considered by experts as the adherent to healthy lifestyle community cohort that does not need in health promotion and chronic non-infective disease prevention. Most likely this assumption causes the lack of proper attention to the true health conditions in fitness members and explains the gaps in research of this kind.

There is no doubt that diverse urban populations are involved in fitness training: this means people of different cultures, ages, gender, somatic condition and socio-economic level [4,6]. Evidence based data indicate that these diversities could determine the physical efficiency, personal functional capacity and mental well-being of the exerciser, which should be taken into account when forming training programmes for fitness clients. Eg: the somatic ability to perform and physiological functioning increase in physically active persons, decline in unhealthy or older persons, and are lower in females *vs* males [8]. These facts are necessarily taken into account by fitness trainers, who are required to conduct standard screening to evaluate changes in submaximal physiological function of their clients performing common well-known treadmill-, cycle ergometer- or step-tests [8-10]. The obtained data help fitness facility staff to define individual training goals and select safe training loads for each of the fitness exercisers. Age is the dominant driver of cardiovascular risk, and impact of aging on somatic and mental health determines the reasonableness of a differentiated approach in the process of assessment of the younger (less than 50 years) *vs* older (aged >50 years) persons [1]. Notwithstanding to strong evidence of the impact of aging and duration of physical activity period on personal well-being [1,3,8] there is no clear understanding of differences in somatic state and functioning; needs, expectations and hopes for training achievements in younger *vs* older, novice *vs* long-term fitness facility clients.

Despite well-known data on prevalence of mood disorders in modern urban society and positive effect of sustained physical activity on mental health [11,12], information on psychological condition and its possible dynamic in fitness members is limited; the psycho-somatic relations in younger *vs* older, novice *vs* long-term fitness facility clients are not clarified. Meanwhile, this information would contribute to the successful implementation of the client-centered approach in fitness training and counselling.

We assume that additional individualizing information can be obtained by examining the possible intercultural differences in fitness clients, however there were no literature on this subject.

Thus, the above mentioned problems indicated the expediency of integrated analysis of fitness clients, for the implementation of which a pilot study was undertaken. The aim was to assess psycho-somatic condition in fitness club members including depending on age, cultural diversity and duration of fitness training.

Subjects

Due to prevalence of women among consumers of fitness industry in Russia [13] we assumed the possibility of a pilot assessment in female fitness members, who gave their voluntary consent to undergo mental survey, additional to the standard baseline fitness-state examination. Inclusion criteria: voluntary consent of fitness club member to participate in the study. The subjects were recruited, interviewed and assessed by fitness club's staff member.

It was a study of 184 (aged from 18 to 66 years) female members of the urban fitness facility, located in St. Petersburg, Russia (Russian Group, RG). To analyze the impact of sustained physical activity on psychosomatic condition of individuals, RG was divided into 2 subgroups of 148 novice (who attended their first fitness training session, RGn) and 36 long-term (involved into 2 years of sustained fitness training at least 150 minutes 2 times a week) female fitness exercisers (RGl).

To investigate the possible intercultural differences in fitness clients, their training goals, expectations and preferences, a comparison group of female novice members of urban fitness facility located in Toronto, Canada was formed. Canadian Group (CG) included 100 subjects, aged from 19 to 71 years.

The impact of ageing on psychosomatic state was analyzed in the subgroups of younger (<50 years) and older (>50 years) fitness clients.

Methods

All recruited subjects volunteered to participate in the study. Obtaining written form of informed consent for mental health interviewing was determined by the specific restrictions connected with the fitness club's privacy policy.

Standard assessment, regulated by the rules of the fitness club, was carried out by its staff member and included: a lifestyle, health problems, medical history, and training goals survey. The subjects were involved into anthropometric procedures: weight, height, Body Mass Index (BMI), Body Fat Percentage were measured. To investigate the physical fitness of the client the standard club-regulated screening methods, suitable for epidemiological studies were used: Tecumseh step-test in RG and standard treadmill fit-test in CG. These indirect sub-maximal stress-tests qualitatively evaluate aerobic performance of the participant according to subject's heart rate recovery data from elite/excellent to poor/very poor levels. The above mentioned stress-tests are recommended by American College of Sports Medicine (2006) and other experts [14,15] as valid and reliable tool in providing standardized measurement of physical training effect.

To obtain more detailed anthropometric data, an additional assessment of waist and hip circumferences, and waist to hip ratio in RG subjects was performed [16].

Additionally RG fitness members self-rated theirs subjective fitness and physical activity levels using 10-score self-rating Visual Analogue Scale (VAS). This scale is reproducible and sensitive, and can be used to monitor the physical training effect [17].

RG females were screened for depression and anxiety with the Russian version of Hospital Anxiety and Depression Scale (HADS). HADS is a valid self-rating screening tool with acceptable properties for detecting mood disorders in non-psychiatric settings, successfully and commonly used in non-English speaking cohorts [18].

Coping strategies in behavioral, emotional and cognitive domains were evaluated in RG females according to Russian version of E.Heim's coping inventory (1988). Heim's technique allows respondent to choose the most preferable coping strategies (cognitive, emotional and behavioral) in the conflict situations and is actively used in Russian psychology focusing on gender, age and other features of coping behaviour [19,20].

Limitation of the study was the absence of mental research in CG due to the privacy policy of the fitness club.

Statistic analysis

STATISTICA version 7.0 was used. Statistical significance was set at $p<0.05$. Correlations between variables were evaluated according to Pearson coefficients. Data comparison was performed using one-way Analysis of Variance (ANOVA).

Results

Novice RG (RGn) (n=148, average age, 42±2.4 years) included two subgroups of 123 younger (<50 years; age, 31.5±0.6 years), and 25 older (>50 years; age, 51.7±1.2 years) fitness clients.

Novice CG was represented by 50 younger (<50 years; age, 31±1 year), and 50 older (>50 years; age, 59±1 year) persons.

RGn respondents were married in 61%, single in 39% cases; non-university and university education was registered in 18% and 82% cases, respectively. RGn positioned themselves as sedentary in 70% cases. The self-assessed baseline level of physical activity in RGn according to 10-score VAS was rather low: 3±0.4 on average. The duration of previous sedentary period (5.6±0.6 years) was positively associated with age ($r=0.41$; $p<0.05$) and lasted up to 8.5±2.2 years in the older RGn females.

Limitation of the study: personal information in CG was not available due to privacy policy of the Toronto fitness club. Medical history in RGn and CG groups are presented in table 1.

According to baseline interview the prevalence of health problems was higher in RGn. Eg: arterial hypertension was more frequent in RGn subjects (45% cases *vs* 13% cases in Canadian study group of all ages). Should be noted that antihypertensive therapy was mentioned by 17% of hypertensive RGn fitness-clients *vs* 100% of hypertensive subjects in CG. Bone and joints problems were predominant in 41% of RGn and 45% of CG females. Study groups' anthropometric data are presented in table 2.

According to international non-infective disease prevention and management guidelines [1,21-23] body weight in older RGn and CG females was unhealthy (defined using BMI as overweight). BMI and Hip Circumference in younger females were lower in RGn ($p<0.05$). Waist Circumference (one of the indices of body's fat distribution) was high [1,22] in older RGn females, and higher than in younger ones ($p<0.05$). BMI correlated with age in RGn aged <50 years ($r=0.49$; $p<0.02$). Waist-hip ratio in RGn was in normal range. Adjusted to age Body Fat Percentage (BFP) rated RGn and CG females as lightly overweight.

To assess baseline aerobic fitness in study groups sub-maximal stress-tests were performed. RGn subjects undergo Tecumseh step-test, the results are presented in table 3. The prevalence of low-level ('poor to low' results) and high-level ('good to excellent' results) step-test results was 54% *vs* 21% in younger subjects, in comparison to 32% *vs* 32% in older RGn females. Exercise-induced hypertension was registered in 10 fitness clients, all of them were normotensive at pre-test assessment.

Compared to RGn 'poor to very poor' results were not registered in CG; 'good' to 'excellent' results happened in 42% of younger

Female Fitness Members	'Heart Problems'	The History of High Blood Pressure	Palpitation	Increased Cholesterol Level	Locomotive System Problems	Tobacco Users
RGn age<50, n=123	22.4%	7.2%; pharmacotherapy in 2.4% cases	12%	Never checked	31.2%	7%
RGn age>50, n=25	76%	64% ; pharmacotherapy in 13.6% cases	18%	Never checked	77%	
CG age<50, n=50	-	-	-	8%	26%	9%
CG age>50, n=50	4%	28% ; pharmacotherapy in 100% cases	-	26%	68%	
RGl age<50	-	-	-	Never checked	25%	5.5%
RGl age>50		45% ; pharmacotherapy in 15% cases	-	Never checked	35%	

Table 1: Health problems in female fitness clients.

Female Fitness Members	BMI, kg/m²	Waist Circumference, cm	Hip Circumference, cm	Waist-hip Ratio	Body Fat Percentage
RGn age<50, n=123	23.8±0.4 (p=0.03)'	75.3±1 (p<0.02)""	100±0.8 (p<0.05)""	0.74±0.007	29±0.5 (lightly overweight^^)
RGn age>50, n=25	29.9±1.7 p<0.05"' (overweight **, ^,*)	88.9±2.9 (weight reduction should be advised**,^)	109±2.1	0.8±0.02	33.7±1.02 p=0.0001"' (lightly overweight^^)
CG age<50, n=50	25.6±0.7 p=0.01" (overweight **,*,^)	N/A	N/A	N/A	28.5±0.9 (lightly overweight^^)
CG age>50, n=50	28.5±0.8 overweight **,^,*)	N/A	N/A	N/A	32.9±0.9 (lightly overweight^^)

Table 2: Anthropometric data in study groups.

** - [1]; * - [21]; ^ - [22]; ^^ - [23]; ' - compared to CG<50 years; "' - compared to RGn<50 years; " - compared to CG>50 years; ""- compared to RGn>50 years.

Tecumseh Step-test	RGn	RGn, age<50 years	RGn, age>50 years	RGl	RGl, age<50 years	RGl, age>50 years
Excellent	8%	8%	8%	14%	25%	5%
Very good	6%	5%	12%	42%	44%	40%
Good	9%	8%	12%	14%	13%	15%
Fair	27%	25%	36%	25%	13%	35%
Low	11%	9%	20%	5%	5%	5%
Poor	39%	45%	12%	-	-	-

Table 3: Cardiorespiratory fitness assessment in RGn and RGl.

The results of Treadmill fit-test in CG females are presented in table 4.

Treadmill Fit- test	CG	CG, age<50 years	CG, age>50 years
Elite	5%	-	11%
Excellent	8%	13%	3%
Good	24%	29%	18%
Above average	41%	36%	47%
Average	19%	19%	18%
Below average	3%	3%	3%
Poor	-	-	-
Very poor	-	-	-

Table 4: Baseline cardiorespiratory fitness assessment in CG.

and 21% of older CG females. Only older CG exercisers demonstrated 'excellent' treadmill-test results (11% cases). Thus the data obtained showed better physical functioning in CG compared to RGn.

Baseline training goals in respondents are presented in table 5. In accordance to subjective health problems and anthropometric data the main training goals (health improvement and weight reduction) in both study groups could be considered absolutely reasonable. The intention of CG females to improve well-being and younger RGn participants to improve their appearance could be considered specific to study cohorts.

In RGn according to HADS the average depression (3.8±0.2) and

Training Goals	RGn		CG	
	age< 50years	age> 50years	age< 50years	age> 50years
Health improvement	40.4%	84%	32%	32%
Weight reduction	32%	32%	64%	70%
Muscle tone improvement	18%	8%	7%	62%
To get fit	14%	-	20%	20%
To perform physical exercises	3%	-	-	-
To improve well-being	-	-	22%	24%
Nice appearance	14%	-	2%	2%
Mood improvement, positive emotions	3%	16%	11%	6%

Table 5: Baseline training goals in female fitness clients.

anxiety (5.8±0.2) scores did not exceed normal range. Nevertheless, among females aged <50years anxiety was registerd in 23% subjects: as borderline anxiety disorder (15% cases), and as significant anxiety (9% cases). Border-line depression demonstrated 3.6% of younger fitness members. In RGn aged >50 years no depression was registered, but 1 case of borderline and 1 case of significant anxiety were revealed. In RGn depression correlated with BMI ($r=0.52$; $p<0.05$), BFP ($r=0.32$; $p=0.028$), and was associated with VAS self-rating of physical condition ($r=-0.44$; $p<0.01$).

Assessment of coping strategies indicated that predominant behavior patterns in RGn were: constructive 'altruistic' and 'counsel referral' strategies in older females (81%); constructive 'cooperation' and 'counsel referral' strategies in younger persons (67%). Non-constructive behavior demonstrated 9% of older ('isolation' strategy) and 14% of younger females ('avoid' pattern predominantly). Predominant emotional strategy in RGn was 'optimism': 67% cases in older and 56% cases in younger subgroups. Negative non-constructive emotions were inherent in 19% of older females ('obedience' and 'suppression') and in 18% of younger fitness members ('obedience' and 'self-accusation'). In cognitive domain older respondents preferred constructive (38%, 'own value') and relatively constructive (48%, 'denotation') strategies. In younger RGn subgroup almost half (47%) of subjects used relatively constructive cognitive coping ('denotation'), in 36% cases they demonstrated constructive ('aplomb', analysis', 'own value') strategies, non-constructive ('dissimulation') cognitive coping was registered in 18% cases. 14% of respondents of all ages with non-constructive coping demonstrated increased values of anxiety and/or depression (HADS).

The impact of long-term physical activity on psychosomatic condition was analyzed in RGl group. RGl included 36 female fitness members who gave their voluntary consent, and have been involved into 2 years of sustained fitness training. Their training programme included supervised combination of aerobic exercises (at moderate-vigorous intensity) and muscle strengthening activity (at moderate intensity) at least 150 minutes 2 to 5 training sessions a week. Thus, RGl individuals reached the recommended by experts beneficial level of long-term physical activity [1].

The average age of RGl subjects was 48.3±2years (older than RGn, $p<0.03$). The study group was represented by 16 younger (<50 years; age, 34±8 years), and 20 older (>50 years; age, 59±4 years) persons.

RGl respondents were married in 58%, single in 42% cases; non-university and university education was registered in 20% and 80% cases, respectively.

As long-term training persons, RGl did not position themselves as sedentary. According to VAS score (6±2.1) their self-assessed level of physical activity was higher than in novice fitness members ($p<0.001$).

Medical history in RGl group is presented in table 1. Compared to RGn, long-term physically active females of all ages demonstrated lower prevalence of health problems. Locomotive system disorders in RGl were registered almost half as much as in RGn. Prevalence of non-smokers in RGl was lower than in RGn.

Anthropometric measurements are presented in table 6. In RGl younger females anthropometric data did not exceed normal range. According to BMI older RGl were overweight, their Waist Circumference was high, but lower than in older RGn subgroup ($p<0.01$). Waist-hip ratio in RGl did not exceed normal range. In RGl age correlated with BMI ($r=0,42$; $p=0.032$), Waist Circumference ($r=0,43$; $p<0.03$) and Waist-hip ratio ($r=0,34$; $p<0.02$).

Tecumseh step test confirmed improved cardiorespiratory fitness in the engaged into long-term physical activity females (Table 3). RGl demonstrated prevalence of 'good - excellent' stress-test results in comparison with RGn (70% *vs* 23% cases, respectively). The prevalence of 'poor' to 'low' and 'good' to 'excellent' results was 5% and 82%, respectively, in younger RG1 *vs* 5% and 60% in older RG1 subjects. There were no 'poor' results and no exercise-induced hypertension in RGl of all ages.

Female Fitness Members	BMI, kg/m²	Waist Circumference, cm	Waist-hip Ratio
RGl age<50	24.6±3.5	76.2±6.7	0.75±0.04
RGl age>50	26.2±3.9 (overweight)*	80.9±0.07 p=0.01" (no further weight should be gained)*,^	0.79±0.07
RGn age<50	23.8±0.4	75.3±1	0.74±0.007
RGn age>50	29.9±1.7 (overweight)*	88.9±2.9 (weight reduction should be advised)*,^	0.8±0.02

Table 6: Anthropometric data in RGl and RGn.

*- [1]; ^ - [22]; "- compared to RGn>50 years

In RGl of all ages normal values were observed for depression (3.4±1.6) and anxiety (3.6±1.2). Border-line anxiety demonstrated the only one female, aged >50 years.

Predominant behavior coping patterns in RGl were: non-constructive 'isolation' and 'avoid' (40%), constructive 'altruistic', 'cooperation' and 'counsel referral' strategies (30%), relatively constructive 'diversion' and 'compensation' (30%) in older females; constructive 'cooperation' and 'counsel referral' strategies (75%) in younger persons. Non-constructive behavior demonstrated 10% of younger females ('isolation'). Predominant emotional strategy in RGl was 'optimism': 65% in older and 65% cases in younger subgroups. Negative non-constructive emotions were inherent in 25% of older females ('suppression') and in 20% of younger fitness members ('suppression' and 'hopelessness'). In cognitive domain older respondents did not demonstrate non constructive coping, but preferred constructive (65%: 'aplomb' and 'analysis') and relatively constructive (35%: 'denotation' and 'relativity') strategies. In younger RGl subgroup 50% of subjects used relatively constructive cognitive coping ('denotation', 'religiosity'), in 35% cases they demonstrated constructive ('aplomb', 'analysis', 'own value') strategies, non-constructive ('disregard') cognitive coping was registered in 15% cases.

RGl subjects' training goals changed in comparison with RGn. Main objectives in long-term fitness members were positive emotions and mood improvement (80% *vs* 61% in novice exercisers), and health improvement (80% *vs* 48% in novice respondents). To get fit preferred 70% of RGl individuals (*vs* 9% in RGn). 5% of physically active subjects chose to reduce weight (*vs* 33% in novice participants). Prevalence of intentions to promote muscle tone and to improve the appearance in novice and long-term fitness members were comparable.

Discussion

Due to in-fitness facility's privacy policy our investigation was limited to provide methodological and evaluation identity in Canadian and Russian respondents. It happened that maximum available assessment of female fitness members was provided in RG subjects.

In accordance to findings that education is a fundamental social motivator of healthy lifestyle [24] our study showed that novice Russian female fitness exercisers at baseline had such benefits as predominant university education and certain level of social well-being. Russian novice fitness members self-rated themselves as physically inactive persons. They demonstrated less discipline and strict practical implementation of blood pressure control, and reported more health problems than Canadian individuals. These data correspond with the higher prevalence of arterial hypertension in Russia (35-45% of adults) than in Canada (23% of adults) [25,26]. The prevalence of non-smokers in RGn respondents was higher than in CG by 1%. The findings diverge from general statistical data that indicated in 2015 adult females smoking rate in Canada as 10% *vs* 22.8% in Russia [27,28] and indirectly confirm intention of Russian novice exercisers to improve their somatic well-being.

No age restriction for fitness training was registered in RG and CG. Canadian 'olders' were older than Russians ($p<0.05$) which makes it possible to assume better somatic condition of Canadian seniors. The anthropometric data showed that according to international guidelines Russian younger novice female fitness members were lightly overweight, older subjects were overweight ($p<0.05$). The Canadian participants of all age also happened to be overweight, and BMI in older persons was higher ($p=0.01$) than in younger subgroup. BMI in Canadian females aged <50 was higher than in Russian younger subgroup ($p=0.03$). BFP detected that all participants were lightly overweight, but BFP in younger Russian females was lower than in older subjects ($p=0.0001$). Thus the unhealthy body weight and body composition were registered in all novice exercisers, and as expected, in older females predominantly. Minding compelling evidence of increased all-cause mortality, comorbidity and cardiovascular

disease risk in overweight persons, most of novice fitness clients needed to reduce weight according to American College of Endocrinology clinical guidelines, Canadian Cardiovascular Society Guidelines and European guidelines on cardiovascular disease prevention [1,21,22,29]. Prevalence of overweight in study groups confirm the necessity of more preventive efforts (including counselling and informing about cardiovascular health, nutrition, physical activity and healthy lifestyle) in female fitness members despite of subjects' age, educational and cultural diversities.

Physical stress-tests' results supported the assumption of Canadian study group as persons with higher aerobic fitness level compared to Russian fitness members. Our data concerning exercise-induced hypertension registered in baseline normotensive RGn subjects sustain our suggestion to stratify fitness members into hypertensive risk groups to provide safe and adequate physical training.

Despite normal average level of depression and anxiety in RGn subjects, 23% cases of anxiety and and 3.6% cases of depression were registered in Russian female fitness members aged <50years. Identified prevalence and level of anxiety and depression happened to be lower than those registered using HADS inventory in regional adult populations of Russian Federation [30]. In RGn respondents depression was associated with elevated BMI that corresponds with the evidence of increased risk of affective disorders in obese and overweight persons [31].

Analyses of coping strategies in fitness female novice exercisers indicated dominating of constructive coping in cognitive (71%) and emotional (62%) domains. Behaviour coping was represented predominantly by constructive (40%) and relatively constructive (32%) coping-mechanisms. It was noteworthy that 14% of RGn subjects with non-constructive coping demonstrated increased levels of anxiety and/or depression. However, preferred by Russian novice female fitness members 'cooperation', 'counsel referral', 'optimism', 'analyses' marked off their readiness for cooperation with fitness experts in selection of training programmes and training goals setting.

Comparison of training goals in RGn and CG revealed that more Canadian females aged >50 years whose physical stress-test results were higher than in Russian older subjects were aimed at further increase of their fitness level and muscle tone. However prevalence of intention to improve health and its somatic component in younger Canadian and Russian novice fitness members was comparable.

33% of RGn and 67% of CG persons stated losing weight as a training goal. This finding was in absolute agreement with European and Canadian Guidelines that associate healthy lifestyle and health benefits with physical activity and healthy weight maintaining [1,29]. However, according to anthropometric data the prevalence of overweight Russian females was higher (38% cases), than number of those whose training goal was to reduce weight (33% cases).

Intention to enhance well-being was inherent only in CG. The goal to improve their appearance was set by 14% of RGn subjects aged <50 years and only by 2 Canadian females. Thus, well-educated and socially adapted Russian female fitness members demonstrated more dissatisfaction with their appearance. These data support the idea of L. McLaren and D. Kuh [32] that socially advantaged women could be more dissatisfied with their bodies. Moreover, anxiety and depression could additionally increase self-doubt and demand to improve appearance in younger Russian fitness exercisers.

In comparison with Canadian females Russian fitness members more often noted positive emotions and mood improvement as the individual training goals (8% *vs* 61% cases, respectfully) that could be result of anxiety and depression prevalence in the cohort (the limitation of our study was the absence of mental assessment in CG). The above mentioned findings are in agreement with the concept of connection of physical activity with emotional benefits [33] and support our opinion on necessity to assess and consider mental conditions in fitness members.

Our findings in RGl assessment were as follows. Training for 2 years female fitness exercisers happened to be older than novice respondents, but their social state and educational level were comparable. RGl persons also proved to be more disciplined and adherent to a healthy lifestyle.

As expected RGl respondents compared to RGn demonstrated less prevalence of health problems and positive self-assessment. In average, females involved into regular fitness training did not self-rate themselves as sedentary.

Evidence suggests that sustained physical activity may be beneficial for comorbidity decrease and for both prevention and treatment of arterial hypertension [1,31]. Our findings confirmed that adherent to adequate long-term fitness training and pharmacotherapy respondents noted arterial hypertension in 45% cases *vs* 64% in less disciplined novice fitness members. Physically active exercisers aged <50 years did not mention cases of high blood pressure. Locomotive problems also appeared less frequently in RGl, in older subjects predominantly. Number of smokers in RGl was 5.5% *vs* 7% in RGn.

Anthropometic data also supported the concept of health benefits in physically active individuals [1]: only older RGl exercisers remained overweight, but their Waist Circumference was less than in RGn aged >50 (p=0.01). Minding that BMI could be a poor index of body fatness in trained persons [23] we considered the absence of BFP measures in the assessment of long-term female fitness members to be limitation of the study.

As expected, regular long-term physical activity increased aerobic fitness [1,3] in RGl: prevalence of 'good to excellent' stress-test results increased, no poor results were registered in subjects of all ages. Absence of exercise-induced hypertension in long-term fitness members also confirmed substantial benefits of regular physical activity [34].

It should be noted that despite positive changes in aerobic fitness there were no significant reduction in BMI in older RGl subjects, but their Waist Circumference beneficially was lower than in older RGn subgroup ($p<0.01$).

Our findings concerning normal HADS scores in long-term female fitness members of all ages was in agreement with evidence that physical activity is associated with reduced mood disorders [35].

Comparative analyses of coping strategies in RGl females revealed similar to RGn subjects prevalence of constructive emotional; constructive and relatively constructive cognitive coping-mechanisms. In behavioral domain predominant constructive coping was registered in RGl younger females; on the contrary, older long-term fitness members more often (in 40% cases) demonstrated non-constructive behaviour: 'isolation' and 'avoidance'. This negative change in the preferred coping strategies requires further investigation in physically active females.

Training goals in the long-term physically active cohort were modified in comparison with those in RGn. Probably, the absence of a significant weight loss after 2 years of continuous physical exercises in older fitness members decreased overall intention in RGl to reduce weight. Such a change in the training goals setting needs further investigation and indicates the importance of continuous informing and counselling, as well as training strategy modification in the older females involved into sustained fitness training. RGl respondents already having received somatic benefits of long-term physical activity demonstrated their aims to further health and fitness improvement. Of interest, despite the normal levels of anxiety and depression the long-term fitness members still experienced noticeably increased demand for positive emotions. These findings show the necessity of further assessment and considering of physical training and mental health associations in physically active persons.

Conclusion

The obtained data confirm the necessity of accurately designed psycho-somatic assessment of female fitness-clients due to presumable arterial hypertension, registered exercise-induced hypertension in subjects normotensive at rest, locomotive problems, predominantly increased weight and prevalence of mood disorders.

The unhealthy body weight and body composition were registered in all novice female exercisers, in older subjects predominantly. Only 33% of Russian novice fitness members aimed at weight loss *vs* 38% of registered overweight and obese persons. The sustained fitness training for 2 years helped to maintain normal range of BMI and Waist Circumference in females aged <50 years, but not in fitness members aged >50 years. Thus, weight loss strategy requires special analyzes and modification in female fitness members of all ages, and the mentioned cohort could be considered as a target group for further lifestyle changing and counseling.

In comparison to Russian novice female fitness members, Canadian exercisers demonstrated higher aerobic fitness level, more intention to enhance their working capacity and well-being, reported less health problems, and less often noted positive emotions and mood improvement as the preferred training goal than Russian females. Russian novice exercisers were more dissatisfied with their appearance than Canadian fitness members. Compared to Russian individuals, Canadian novice fitness clients with arterial hypertension were adherent to blood pressure control.

In Russian novice female fitness members aged <50 years anxiety and depression were screened in 23% and 3.6% cases, respectively. It makes the cohort of younger female fitness exercisers a target group for accurate mental health assessment and specific counseling

Compared to novice exercisers, Russian females involved into sustained fitness training have reached the physical activity level recommended by the experts, and demonstrated more adherence to healthy lifestyle, better somatic condition and aerobic fitness, absence of exercise-induced hypertension, normal levels of depression and anxiety. Negative changes in coping strategies, and pronounced need in positive emotions make long-term female fitness members a target group for psycho-somatic assessment and possible specific intervention.

Conflicts of Interest

The authors report no conflicts of interest.

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