PREVALENCE OF CERTAIN CHRONIC DISEASES SENSITIVE TO KINESIOLOGICAL TREATMENT IN PHYSICALLY ACTIVE VS INACTIVE POSTMENOPAUSAL WOMEN

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Abstract:

The aim of the study was to investigate the differences between the prevalence of certain diseases sensitive to kinesiological treatment in physically active and inactive women aged 50 to 65. A total of 214 Caucasian urban women responded to the questionnaire on their health status. 111 women had been participating in aerobic classes 2-4 times a week for at least 5 years, while 103 women had never been involved in regular physical activity. The women were asked if they had been diagnosed with any of the following non-communicable diseases or health conditions: bone loss, coronary heart disease, heart arrhythmia, hypertension, diabetes mellitus, chronic low back pain, functional limitations of joints, anxiety, and depression. A statistically significant difference in the prevalence of two diseases was found. A significantly lower number of active women reported symptoms of heart arrhythmia ($\chi^2 = 4.36$, $p < 0.05$) and anxiety ($\chi^2 = 6.77$, $p < 0.01$). The results of the investigation showed a significant difference between physically active and inactive postmenopausal women in two health conditions. Fewer active women reported heart arrhythmia and anxiety symptoms.

Key words: *physical activity, chronic non-communicable diseases, postmenopausal period*

Introduction

The beneficial effects of physical activity on both physical health and psychological well-being throughout a life-span have long been recognised (Elavsky & McAuley, 2005; Curl, 2000), and the need for increasing physical activity involvement of the general population has become common knowledge. With the world-wide trend of an aging society, research on health–promoting and disease-prevention benefits of regular physical activity in the older population becomes increasingly important. Prolongation of life expectancy leads to an increase in the number of elderly people with the accompanying age-related diseases and health discomforts. Although declines in physical and psychological functions over a lifespan must be accepted as an inevitable result of the biological aging process, rapidly accumulating scientific evidence shows that many of the health-related problems commonly associated with older age can be prevented or controlled (Meyer et al., 2001; McAuley, 2001), and that physical activity plays a substantial role in chronic disease prevention and promotion of healthy aging (King et al., 2005).

Although regular physical activity contributes positively to the improvement and maintenance of health, statistics show that the inactivity of the population progressively increases with age (Morss et al., 2004). Scientific findings of numerous studies (Vuori, 2004; Hernelahti, Kujala, & Kaprio, 2004; Woo, 2000; Lees & Booth, 2004; Fleischmann et al., 2004) confirm that many chronic diseases are more common in inactive individuals than in the persons engaged in regular physical activity. Physical inactivity is shown to be an actual cause of many chronic diseases (Vuori, 2004; Lees & Booth, 2004; Meyer et al., 2001), which could be referred to as diseases sensitive to a kinesiological treatment. There is accumulating evidence that different confounding factors (age, sex, body fat percentage, diet, smoking, alcohol intake, education, income) play no role in the relationship between the increased prevalence of chronic diseases and physical inactivity (Vuori, 2004), i.e. physical inactivity acts as

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an important morbogenic factor *per se*. Due to the prevalent sedentary lifestyle, the incidence of the aforementioned chronic diseases in industrialised countries is growing continuously (Vuori, 2004), making physical inactivity a major public health problem world-wide, especially in the older population. Moreover, increased morbidity and mortality, associated with physical inactivity and related overweight and obesity, constitute a significant portion of the total health care expenditures (Anderson et al., 2005). Consequently, potential resources of introducing and maintaining a physically active life-style in the general population, as well as scientific evidence on the positive health effects brought about by regular physical activity have become of a major study interest in medicine and sport science with the results aimed at (inter)national implementation of health-enhancing physical activity initiatives.

The aging of society, the increasing trend of a longer life expectancy, and the longevity of women relative to men, make postmenopausal women one of the fastest growing segments of the population (Elavsky & McAuley, 2005; Curl, 2000). Many hormonal and metabolic changes, appearing around and after the menopause, put women of this age group at high risk for developing cardiovascular diseases, osteoporosis, and weight gain. Many studies demonstrated that regular physical exercise can make menopausal signs and symptoms easier to face with and tolerate; it can further prevent and suppress a number of chronic diseases, including the aforementioned cardiovascular diseases and osteoporosis, as well as to lower the risks of some cancers (Lindh-Åstrand, Nedstrand, Wyon, & Hammar, 2004; Jeng, Yang, Chang, & Tsao, 2004). Physical activity can also play a positive role in the enhancement of mental health. Namely, during the transition into menopause, women experience many psychological changes, such as depression, low self-concept, and anxiety, which can be counteracted by regular physical exercise (O'Sullivan, Ready, & Albinson, 2001; Watanabe, Takeshima, & Okada, 2001; Elavsky & McAuley, 2005). Moreover, physical activity can positively influence the changed attitude towards health perception. There is evidence of a hypochondriac lifestyle peak period at the age of 60 to 65, especially in women (Schaie & Willis, 2002). Due to the well-documented positive health and well-being outcomes for older women, regular physical activity has been promoted and recognized as the best non-medical treatment of postmenopausal problems (Jeng, Yang, Chang, & Tsao, 2004; Conn, Minor, & Burks, 2003).

The aim of this study was to determine if there was a statistically significant difference in the prevalence of several diseases sensitive to kinesiological treatment between regularly physically active and inactive urban women aged 50 to 65, by means of a self-reported questionnaire. It was hypothesised that the prevalence of the nine observed diseases/conditions would be higher in the inactive group.

Methods

Subjects

The study sample consisted of 214 postmenopausal Caucasian women aged 50-65, residents of Zagreb, who voluntarily participated in the study. 111 women had participated in regular physical activity (an aerobic exercise programme) 2-4 times a week for at least 5 years at a physical recreation centre. Each exercise class included 10 to 15 minutes of warm-up, followed by 30 minutes of combined resistance and aerobic exercise (at a moderate intensity of 60-70% of maximal oxygen uptake), followed by 10 to 15 minutes of cool-down exercise and stretching. The inactive group consisted of 103 women recruited with the assistance of a gynecological clinic. They were contacted by telephone and mail, acquainted with the description of the study and were invited to participate. Only the women who had never been engaged in any kind of regular physical activity were included in this group. No significant difference between the two groups was found regarding body weight (active group 68 ± 9.27 kg; inactive group 68.4 ± 10.1 kg; $t = 0.17$, $p = 0.862$) and body height (active group 162.6 ± 5.6 cm; inactive group 162.7 ± 5.5 cm; $t = -0.22$, $p = 0.828$). The two groups differed slightly in age (active group 59.3 ± 4.8 years; inactive group 57.2 ± 4.6 years; $t = 3.28$, $p = 0.001$). The active women were, on average, two years older. Despite the statistical significance of this difference, the fact that it opposed the hypothesis made its confirmation more difficult.

The study was approved by the Faculty of Kinesiology University of Zagreb Ethical Advisory Committee and written informed consent was obtained from all the participants.

Measurements

The obtained answers are the part of a pool of data collected by a self-reported questionnaire composed for a larger study on the health and quality of life of postmenopausal women. The women were asked if they had been diagnosed with any of the following diseases/conditions: bone loss (osteopenia and/or osteoporosis), coronary heart disease, heart arrhythmia, hypertension, and diabetes mellitus. They were asked if they had experienced chronic low back pain; stiffness, pain or functional limitations of joints; as well as states of anxiety and/or depression. The active women were given the questionnaire in a physical recreation centre and inactive women received the questionnaire by mail. Both groups completed the questionnaires at home and returned them

on their visit to the physical recreation centre or gynecological clinic.

Data analysis

The obtained data were analyzed by the statistical package Statistica for Windows (Version 6.0). Frequencies of each disease in both groups were calculated, and the Chi-square test was used to determine the differences in the prevalence of diseases between the active and the inactive group of women.

Results

As shown in Table 1, most of the women in both groups did not report any of the listed health conditions and/or symptoms, except for joint stiffness/ pain. Regardless of the engagement in physical activity, a larger number of women of both groups complained about these symptoms.

The obtained results partly confirmed our hypothesis. Statistically significant difference of the prevalence of two diseases was found (Table 2). A significantly lower number of active women (Table 1) stated symptoms of heart arrhythmia ($\chi^2 = 4.36$, $p < 0.05$) and anxiety ($\chi^2 = 6.77$, $p < 0.01$). No statistically significant difference in the prevalence of the other observed diseases between the two groups was found.

Discussion and conclusions

Analysis of the data obtained from this sample did not fully confirm the initial hypothesis about the higher prevalence of the nine diseases sensitive to kinesiological treatment in the inactive group compared to the group of regularly physically active women aged 50 to 65 years.

The results showed the significant difference in the prevalence of only two conditions between the two groups – a fewer of the active women reported heart arrhythmia and anxiety symptoms.

The expected lower prevalence of anxiety found in the active group corresponded to the results of the extensive series of meta-analyses that investigated the effects of acute and chronic physical activity on anxiety (Paluska & Schwenk, 2000). The authors found that exercise was associated with a reduction of anxiety symptoms, and that, clinically implemented, regular physical activity might play an important role in alleviating these symptoms. Both aerobic training and strength and flexibility training proved to be effective for treating anxiety symptoms, although the aerobic exercise programmes produced a stronger effect than the weight training and flexibility regimens (Paluska & Schwenk, 2000). The findings obtained in the clinical trials indicate the neurochemical effects of physical activity responsible for lowering the likelihood of the onset and severity of state anxiety symptoms (Goodwin, 2003). Higher levels of endorphines, associated with physical activity, lead to stress reduc-

Table 1. Frequency and percentage of diseases in the active and the inactive group of women aged 50-65 years

Disease	Active Group (N=111)		Inactive Group (N=103)	
	No	Yes	No	Yes
Bone loss	76 (68.5%)	35 (31.5%)	76 (73.8%)	27 (26.1%)
Coronary heart disease	110 (99.1%)	1 (0.9%)	100 (97.1%)	3 (2.9%)
Heart arrhythmia	92 (82.9%)	19 (17.1%)	73 (70.9%)	30 (29.1%)
Hypertension	80 (72.1%)	31 (27.9%)	81 (79.6%)	21 (20.4%)
Diabetes mellitus	111 (100%)	0 (0%)	100 (97.1%)	3 (2.9%)
Low back pain	67 (60.4%)	44 (39.6%)	51 (49.5%)	52 (50.5%)
Joint stiffness / pain	47 (42.3%)	64 (57.7%)	39 (37.9%)	64 (62.1%)
Anxiety	99 (89.2%)	12 (10.8%)	78 (75.7%)	25 (24.3%)
Depression	95 (85.6%)	16 (14.4%)	78 (75.7%)	25 (24.3%)

Table 2. Differences in the prevalence of diseases between the active and the inactive women aged 50-65 years

Diseases	Chi-square (df=1)	p
Bone loss	0.73	0.3915
Coronary heart disease	1.18	0.2776
Heart arrhythmia	4.36	**0.0367***
Hypertension	1.55	0.2129
Diabetes mellitus	3.28	0.0702
Low back pain	2.54	0.1110
Joint stiffness / pain	0.45	0.5044
Anxiety	6.77	**0.0093****
Depression	3.35	0.671

* p<0.05, ** p<0.01

tion and mood improvement (Mirzaiinjmabadi, Anderson, & Barnes, 2006). Exercise provides a distraction from everyday problems (Horga, 1999), as well as from negative or threatening thoughts typical for the anxiogenic perspective. In other words, exercise movements and breathing can positively influence the mental condition.

Conclusions about the influence of physical activity on heart arrhythmias cannot be formed without the detailed information on the possible organic causes of these conditions (e.g., conductive abnormalities). Nevertheless, the significantly lower prevalence of arrhythmia observed in the active group could, at least partly, be attributed to exercise-induced adaptation (i.e., parasympathetic neural activity) with a consequently more regular and stable heart activity. The finding is consistent with a previous study, showing that regular physical activity has positive effects on the vagal activity on the heart and consequently attenuates the effects of aging on the autonomic control of the heart rate (Melo et al., 2005). The result is also congruent with the findings of Schuit and associates (Schuit et al., 1998), showing that regular physical activity favourably affects QT interval duration in elderly women, a consequence of a more favourable autonomic balance through increased parasympathetic activity.

Although taking into account all the obtained results, one might conclude that physical activity does not have a significant positive influence on the prevention of the observed chronic diseases, some limitations of this study should be taken into consideration. It is possible that the positive effects of regular physical activity have not resulted in statistically significant values due to the relatively small number of subjects for such an epidemiological study. A larger sample could contribute to the manifestation of statistically significant differences between the groups in other observed variables. Moreover, Table 1 shows that both the active and the inactive group consisted predominantly of healthy women, indicating a relatively homogenous sample. It is therefore reasonable to presume that a random sample would provide a more representative picture of the chronic-disease prevalence in the female population of this age. Also, methodological limitations, inherent to the cross-sectional studies, preclude the drawing of conclusions regarding causality.

Nevertheless, we believe that our findings provide at least a preliminary support for the beneficial effects of physical exercise in postmenopausal women. Namely, even despite the relatively small number of subjects, the significantly lower prevalence in the active group was found for two of the most frequent somatic and mental health disturbances in the population – cardiovascular and neurotic symptoms/disorders. Due to the public-health importance of the issue, as well as the expected positive cost-effect health-care aspect, further studies are required on the impact of regular physical activity on the prevention of chronic diseases and health promotion to provide baseline information for implementing programmes of health-enhancing physical activity both in the older female population as well as in other segments of the Croatian population. To assure the acquisition of as representative data as possible, means other than the self-reported questionnaires, such as medical documentation and official health statistics, should be considered in the future larger-scale epidemiological studies.

In conclusion, the analysis of the questionnaire results obtained from the sample of 111 active and 103 inactive women, aged 50–65 years, showed a statistically significant difference in the prevalence of heart arrhythmia and anxiety symptoms – more women in the inactive group stated their experience of these symptoms.

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PREVALENCIJA NEKIH KRONIČNIH BOLESTI, OSJETLJIVIH NA KINEZIOLOŠKI TRETMAN, KOD TJELESNO AKTIVNIH I NEAKTIVNIH ŽENA POSTMENOPAUZALNE DOBI

Sažetak

Uvod

Pozitivni učinci tjelesne aktivnosti na fizičko zdravlje i psihičko blagostanje tijekom čitavog života odavno su poznati (Elavsky, & McAuley, 2005; Curl, 2000), a potreba jačeg uključivanja opće populacije u redovitu tjelesnu aktivnost postala je dio opće svijesti. Usprkos spoznajama o pozitivnom doprinosu redovite tjelesne aktivnosti unapređenju i održanju zdravlja, statistike pokazuju da neaktivnost populacije progresivno raste s dobi (Morss, et al., 2004). Znanstvene spoznaje brojnih istraživanja (Vuori, 2004; Hernelahti, Kujala, & Kaprio, 2004; Woo, 2000; Lees, & Booth, 2004; Fleischmann, et al., 2004) potvrđuju da se mnoge kronične bolesti češće javljaju u neaktivnih osoba nego u osoba koje se redovito bave tjelovježbom. Dokazano je da je tjelesna neaktivnost izravni uzrok mnogih kroničnih bolesti (Vuori, 2004; Lees, & Booth, 2004; Meyer, et al., 2001), koje se mogu nazvati bolestima osjetljivimA na kineziološki tretman. Zbog pretežno sedentarnog načina života, incidencija tih bolesti u industrijaliziranim zemljama kontinuirano raste (Vuori, 2004), čineći tjelesnu neaktivnost jednim od glavnih javnozdravstvenih problema diljem svijeta, posebno u starijoj populaciji.

Starenje stanovništva, rastući trend duljeg očekivanog trajanja života, kao i veća dugovječnost žena u odnosu na muškarce, uvjetuju da su žene postmenopauzalne dobi jedan od najbrže rastućih segmenata stanovništva (Elavsky, & McAuley, 2005; Curl, 2000). Brojne hormonske i metaboličke promjene koje se javljaju oko i nakon menopauze, izlažu žene ove dobne skupine visokom riziku razvoja srčanožilnih bolesti, osteoporoze i porasta tjelesne mase. Mnoga su istraživanja pokazala da redovita tjelovježba može ublažiti menopauzalne znakove i simptome, prevenirati i zaustaviti razvoj brojnih kroničnih bolesti, uključujući prije spomenute srčanožilne bolesti i osteoporozu te smanjiti rizik od razvoja nekih karcinoma (Lindh-Åstrand, Nedstrand, Wyon, & Hammar, 2004; Jeng, Yang, Chang, & Tsao, 2004). Tjelesna aktivnost može pozitivno utjecati i na mentalno zdravlje i odnos prema promijenjenoj percepciji zdravlja.

Cilj je ovog istraživanja bio utvrditi postoji li statistički značajna razlika u prevalenciji nekih kineziološki osjetljivih bolesti između redovito tjelesno aktivnih i neaktivnih žena u dobi od 50 do 65 godina, korištenjem anamnestičkog upitnika. Postavljena je hipoteza da će prevalencija devet promatranih bolesti/stanja biti viša u neaktivnoj skupini.

Metode

Ispitanici

Uzorak ispitanika činilo je 214 postmenopauzalnih žena, stanovnica Zagreba, u dobi od 50 do 65 godina; 111 žena bavilo se redovitom tjelesnom aktivnosti u jednom sportsko-rekreacijskom centru (program aerobike umjerenog intenziteta), 2 do 4 puta tjedno tijekom najmanje 5 godina. Neaktivnu skupinu činile su 103 žene, pacijentice jedne ginekološke ambulante. Između dviju skupina nisu utvrđene značajne razlike u tjelesnoj masi (aktivna skupina 68 ± 9.27 kg; neaktivna skupina 68.4 ± 10.1 kg; $t = 0.17$, $p = 0.862$) ni visini (aktivna skupina 162.6 ± 5.6 cm; neaktivna skupina 162.7 ± 5.5 cm; $t = - 0.22$, $p = 0.828$). Dvije su se skupine razlikovale u dobi (aktivna skupina 59.3 ± 4.8 god.; neaktivna skupina 57.2 ± 4.6 god.; $t = 3.28$, $p = 0.001$). Aktivne su žene u prosjeku bile dvije godine starije.

Istraživanje je odobrilo Etičko povjerenstvo Kineziološkog fakulteta Sveučilišta u Zagrebu. Sve su ispitanice upoznate s detaljima istraživanja i dale su pisani pristanak za sudjelovanje.

Mjerenja

Dobiveni odgovori dio su podataka prikupljenih uz pomoć anamnestičkog upitnika sastavljenog za opsežnije istraživanje o zdravlju i kvaliteti života postmenopauzalnih žena. Ispitanice su upitane jesu li im dijagnosticirane sljedeće bolesti/stanja: gubitak koštane mase (osteopenija i/ili osteoporoza), koronarna bolest srca, srčana aritmija, povišen arterijski krvni tlak i dijabetes melitus. Upitnik je sadržavao i pitanja o pojavljivanju kroničnih bolova u križima, bolova i funkcionalnih smetnji u zglobovima, kao i anksioznih i/ili depresivnih stanja.

Statistička analiza podataka

Dobiveni podaci analizirani su pomoću programa Statistica for Windows (ver 6.0). Izračunate su frekvencije svake bolesti/stanja u obje skupine, a koristio se χ^2 test za utvrđivanje razlika u prevalenciji bolesti između aktivne i neaktivne skupine žena.

Rezultati

Utvrđena je statistički značajna razlika u prevalenciji dvaju poremećaja. Značajno manji broj aktivnih žena naveo je dijagnosticirane srčane aritmije ($\chi^2 = 4.36$, $p < 0.05$) i pojavljivanje anksioznih stanja ($\chi^2 = 6.77$, $p < 0.01$). U prevalenciji drugih promatranih bolesti između dvije skupine ispitanica nije nađeno statistički značajnih razlika.

Rasprava i zaključci

Rezultati su pokazali značajnu razliku u prevalenciji samo dvaju poremećaja između dviju skupina – manji broj aktivnih žena naveo je postojanje srčane artimije i simptoma anksioznosti.

Očekivana niža prevalencija simptoma anksioznosti, utvrđena kod aktivne skupine, odgovara rezultatima ekstenzivne serije meta-analiza kojima su istraživani utjecaji trenutne i dugotrajne tjelesne aktivnosti na anksioznost (Paluska, & Schwenk, 2000). Autori su utvrdili da je tjelovježba povezana s redukcijom simptoma anksioznosti te da bi, klinički primijenjena, redovita tjelesna aktivnost mogla igrati važnu ulogu u ublažavanju tih simptoma. Nalazi dobiveni kliničkim studijama ukazuju na neurokemijske učinke tjelesne aktivnosti odgovorne za smanjenje pojavljivanja i jačine simptoma anksioznosti (Goodwin, 2003).

Zaključivanje o utjecaju tjelovježbe na srčane aritmije nije, naravno, moguće bez detaljnih informacija o eventualnim organskim uzrocima ovih poremećaja. No, ipak, značajno niža prevalencija aritmije u aktivnoj skupini mogla bi se, barem djelomično, pripisati tjelovježbom induciranoj adaptaciji (tj. parasimpatičkoj neuralnoj aktivnosti) s posljedičnom pravilnijom i stabilnijom srčanom aktivnosti. Ovaj je nalaz u skladu s ranijim istraživanjem u kojem je dokazano da redovita tjelesna aktivnost ima pozitivne učinke na vagalnu aktivnost srca te, posljedično tome, ublažava utjecaj starenja na autonomnu kontrolu frekvencije srca (Melo, et al., 2005).

Iako bi se na temelju dobivenih rezultata moglo zaključivati da tjelesna aktivnost nema značajan pozitivan utjecaj na prevenciju promatranih kroničnih bolesti, u obzir treba uzeti neka ograničenja studije (relativno malen broj ispitanica, prigodan uzorak, metodološka ograničenja svojstvena presječnim retrospektivnim istraživanjima).

Usprkos tome, vjerujemo da nalazi daju barem preliminarnu podršku pozitivnim učincima tjelovježbe kod postmenopauzalnih žena. S obzirom na javnozdravstvenu važnost problema, kao i očekivani pozitivan odnos troškova i učinka promatran sa stajališta zdravstvenog sustava, nužna su daljnja, šira epidemiološka istraživanja o utjecaju redovite tjelesne aktivnosti na poboljšanje zdravlja i prevenciju kroničnih bolesti. Time bi se dobila temeljna saznanja za implementaciju programa zdravstvene tjelesne aktivnosti (HEPA) kod starije ženske populacije, kao i ostalih segmenata stanovništva Hrvatske.

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