RECREATIONAL PROGRAMMES FOR ADULT MEN BASED ON CLUSTER ANALYSIS OF SURVEY INDICATORS

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Abstract:

A physically active lifestyle has many well-documented benefits. However, we are witnessing an epidemic of sedentary behaviour. Voluntary physical activity, i.e. recreational physical activity, has thus assumed central importance in satisfying the physical activity needs of humans. In order to tailor intervention programmes more individually, a 38-item questionnaire was designed to acquire information on how adult men spend their free time. The goal was to see if any grouping criteria may induce the grouping of the members of a wide male population into certain sub-population groups with recognizable demographic, social and material characteristics, particular health-related issues and specific attitudes towards free time and the way of spending it. The sample was comprised of 319 adult healthy men, from 19 to 67 years of age, from Central Bosnia. The cluster analysis, a method of multivariate hierarchical grouping with Euclidian distances, was used. Six distinct clusters were obtained: first cluster – 18 % of subjects, age 36.2 yrs, most married, positively oriented towards physically active lifestyle, scarcely take medication, no health-related discomforts; second cluster – 35 % of subjects, age 38.6 yrs, married, several children, would like to be more physically active because they are informed about the importance of exercise, but they are not very active and their discomforts are rather pronounced; third cluster – 9 % of subjects, age 28.9 yrs, no marital or parental obligations, not physically active with negative attitudes towards an active lifestyle, under high stress, but feel no discomforts; fourth cluster – 25 % of subjects, age 36.5 yrs, married, a smaller number of children, moderate values in all variables, except for the variables of health discomforts: the value is the highest in the entire sample; fifth cluster – 6 % of subjects, age 45.5 yrs, the oldest in the sample, married, have many children, physical activity is not important to them, they hardly feel any discomforts probably due to the many medications they take; sixth cluster – 7 % of subjects, age 24.8 yrs, no marital or parental obligations, not satisfied either with job no income, no prescribed medication and satisfied with their health status, but unexpectedly very high levels of reported health discomforts. Adequate intervention recreational and sporting activity programmes are proposed in accordance to the features of each cluster. Generally, a lack of information about the crucial role of a physically active lifestyle was observed throughout the clusters, as well as evident passive, consuming-absorbed attitudes towards free time. The previously active athletes in the third cluster were the only exception. The study has provided preliminary evidence for feasibility and value of using a cluster method approach to the identification of typologies of the adult male population. Much effort of expert kinesiologists, and of the broader community and mass media as well, must be invested in the promotion of physical activity, education for active and self-responsible living and in intervention strategies for changing the state of passivity.

Key words: *cross-sectional study, adult men, questionnaire survey, cluster analysis, physical activity, free time, attitudes, health discomforts, leisure-time preferences*

Introduction

A physically active lifestyle has many well documented benefits, like reduced risks of coronary heart disease, hypertension, colorectal cancer, obesity and osteoporosis, then reduced stress and depression (Atkinson, Drust, George, Reilly, & Waterhouse, 2006; Blair, Kampert, Kohl, Barlow, Macera et al., 1996; Filipas, Oldmeadow, Bailey, & Cherry, 2006; Hamer, 2006) on the one hand, and on the other increased emotional well-being, energy level, self-confidence, and satisfaction with social activity (Frederick & Ryan, 1993; Puetz, 2006; Stiegler & Cunliffe, 2006). Some authors have argued that the greatest potential for health benefits would accrue by having sedentary adults become moderately active (Powell & Blair, 1994; Caspersen & Merritt, 1995; Pate, et al., 1995; Dunn, & Blair, 1999). The argument is very optimistic and crucial for the area of sports recreation or physical recrea-

tion. Namely, this means it is never too late in life to terminate a sedentary way of living and assume a moderate-to-vigorous physical activity lifestyle. Unfortunately, current estimates suggest that we are witnessing an epidemic of sedentary behaviours. The mechanization of work and of many domestic chores has eliminated the once obligatory physical activity from modern life. Voluntary physical activity, also called recreational physical activity, has thus assumed central importance in satisfying the physical activity needs (Sherwood & Jeffery, 2000).

Therefore, the promotion of regular physical activity becomes a public health priority. Numerous research findings (e.g., McAuley, 1993; McAuley, Lox, & Duncan, 1993; Malina, 2001a) defined several determinants of exercise behaviour, the knowledge and respect of which have implications for individual and public health recommendations, as well as for intervention strategies for promoting physical activity (Marcus, et al., 1998). During their lives, individuals typically move through various phases of exercise participation that are determined by diverse factors. These physical activity determinants can be roughly divided in two broad categories: individual's characteristics, including motivation, exercise self-efficacy, stage of change, exercise history, body weight, health risk profiles, diet, stress, on the one hand, and environmental characteristics, such as social support, time available, access to exercise facilities and programmes, attributes of exercise programmes (type, variety, intensity, duration), injury risk, costs (Sherwood & Jeffery, 2000), on the other.

World and Croatian research studies (Breton, 1998; Švob, 1999; Markus, 2001; Fjermedal, 1986; Andrijašević & Bonacin, 1997; Šaban, 2004) indicate the role of free, non-working, or leisure time, its amount and the way in which it is spent, as a factor of life quality and recreation participation, but also, eventually, as a factor of work efficacy. However, voluntary physical activity is not very popular, unfortunately. Only 22 % of adults in USA report engaging in regular physical activity, i.e. a minimum of 30 minutes of moderate-to-vigorous activity on most days of the week, whereas some 25% of adults report they never engage in physical activity during leisure time (US Department of Health Humane Service, 1996). The author of the present article also obtained alarming indicators of (non)involvement in physical activity of the student population (mean age 21 years) who reported a relatively high number of discomforts and medical conditions induced by insufficient physical activity, or sedentary lifestyle – they mostly watch TV or socialize with friends in coffee shops; hardly 29 % of them do any sport for recreation here and then and only 5.5 % do any organized sport in sport clubs (Andrijašević, Paušić, Bavčević, & Ciliga, 2005). The report of the World Health Organization (2003) clearly establishes the preventive and therapeutic effects of regular physical activity for a range of physical diseases. A strong case is also made that physical activity helps with recovery from depression and can enhance psychological well-being in general population (Thogersen-Ntoumani & Fox, 2005).

Certain investigations among the work force in Croatia indicate that economic aspects have the greatest contribution to the quality of life, whereas health is only fourth on the ranking list (Kugler, 2006). On the contrary, in similar investigations conducted in Canada and the USA (Corbin, B.C., Linsday, Welk, & Corbin, R.V., 2002), the subjects regard health as most important, and 99% percent of them regard that "being in good health" is the most important need and wish of people in developed countries in this age. Numerous researchers have found that it is important to include physical activity programmes in leisure or non-working time in everyday living and tourism. It is also important to tailor the programmes to the specific needs of the potential participants (Andrijašević, 2000; Malina, 2001b; Strunz, 2002; Andrijašević & Bartoluci, 2004).

A recurrent theme in most recent discussions on physical activity is complexity, i.e. multiple pathways to change (Baranowsk, Anderson, & Carmack, 1998); tailoring interventions with regard to individual, environmental, and cultural characteristics; and increasing the recognition that the determinants of physical activity at initiation, maintenance, and relapse may differ across these three stages of physical exercise involvement, or across a lifespan (Sherwood & Jeffery, 2000).

Unfortunately, in Croatia and the neighbouring region most physical recreation organizations, then fitness centres, gyms and sports-recreational centres, as well as individual exercise and sport professionals (animators in tourism, corporations and nursing homes, primarily) too often design and offer general programmes of exercising or of any kind of physical activity to the general, abstract, "population", whoever that might be. For example, walking is widely promoted, almost as a rule, as a form of physical activity for a variety of beneficiary reasons and usually for people who start to exercise; however, this may not be the most effective strategy for all individuals (Sherwood & Jeffery, 2000). Although exercise professionals consult recent scientific and expert findings and inferences on physical activity, lifestyle, health protection and improvement, benefits and costs, no deeper insights into the preferences and needs of the "potential patrons", or actual target groups within the population, have been taken into account in the process of designing and marketing such programmes. We assume that such knowledge may tremendously expand the list of improved, individually tailored,

hence probably more attractive exercise and sport programmes because they will then be the answers to the actual, real needs of the actual population subgroups (defined either according to gender, age, social status, income rate, place of residence, type of work, attitudes towards leisure time, health status, or any other group-defining criterion).

To see if any of the above-mentioned criteria may induce grouping of members of the wide population into certain sub-population groups with recognizable demographic, social and material characteristics, particular health-related issues and specific attitudes towards non-working time and the way of spending it with a goal to maximally tailor physical activity recommendations or programmes (of physical recreation), a questionnaire was designed to acquire information on how adult men spend their free time. It is expected that certain groups of the sample persons will be defined and that descriptions of these groups will be usable for intervention programming. The obtained information about the probable sub-population group characteristics may be useful not only to the field of applied kinesiology, but also, directly or indirectly, to other areas in which the way of spending non-working or leisure time has certain social or economic effects.

Methods

Sample of subjects

The research embraced 319 adult healthy men, from 19 to 67 years of age, from Central Bosnia (Kiseljak, Vitez, Rama, Prozor, Busovača, Novi Travnik, and Žepče).

To obtain the proper information, the sample was stratified in a way that each age group contained at least 15% of the subjects with the exception of the age group 35-39 years which embraced at least 25% of subjects. The age structure of the sample is shown in Table 1.

Sample of variables

The initial raw data were acquired by means of an anonymous poll using the questionnaire consisting of 38 variables (see Appendix).

Table 1. Chronological age strata

AGE	N	%
– 29	59	18.50
30 – 34	62	19.44
35 – 39	89	27.90
40 – 44	60	18.81
45 –	49	15.36
TOTAL	319	100.00

Six (6) variables (first 4 demographic) of general status were used: *age* (OAGE), *marital status* (OMARR), *number of children* (ONOCH), *work experience* (OWORK), *satisfaction with job* (OSATJOB) and *satisfaction with income* (OSATINC).

Nine (9) variables describing free time: *self-assessment of the amount of free time* (SFREEAS), *free time planning* (SFREEPL), *way of spending free time* (SFREEWA), *existence of sporting activities in free time* (SSPORT), *existence of sporting activities in free time organisation* (SFREESP), *which sporting activities one would like to participate in if he/she had more free time* (SFREEIF), r*easons for absence of sporting activities* (SPNONINV), *readiness to invest money in free time sporting activities* (SSPINVEST), and *interest in physical activities in probable free time* (SINTER).

Further, 8 variables were used to assess health status: *self-assessment of stress* (ZSTRESS), *self-assessment of knowledge about whether physical activity reduces stress* (ZSTRRED), *satisfaction with health* (ZHEASAT), *contribution of physical activity to health improvement and preservation* (ZACTHEAL), *information about contribution of physical activity to health* (ZINFOR), *information sources about contribution of physical activity to health* (ZINFSOUR), *medication* (ZMEDICA), and *physical activity level self-assessment* (ZACTLEV).

Finally, ***15 variables*** were used ***to assess health discomforts*** or conditions: *sleeping badly* (TSLEEP), *tension* (TTENS), *nervousness* (TNER), *feeling of anger* (TANGER), *fear* (TFEAR), *anxiety* (TANX), *feeling of restlessness* (TREST), *feeling of being tired* (TTIRED), *vertigo* (TVERT), *headache* (THEAD, *back pain* (TBACK), l*eg and foot pain* (TLEG), *stomach-ache* (TSTOM), *being overweight* (TWEIGHT), and *high blood pressure* (TBLPRESS).

Data analysis

Non-parametric variables were defined on an ordinary scale in three modalities of answers to the offered statements: complete agreement, partial agreement, disagreement, as well as did the variables describing health-related discomforts and conditions: frequently, sometimes, and seldom. The rest of the variables were either parametric (age, work experience) or cumulative as being the sum composites of several answers (*way of spending free time, resons for absence of sporting activities, interest in physical activities in probable free time*).

Fifteen variables regarding health status were preliminary subjected to factorization in which 4 interpretable latent dimensions were obtained: ***general tension*** (PGENTEN), ***general somatic conditions*** (PSOM), ***general anxiety*** (PANX) and ***pain induced by excessive standing*** (PEXCST). For the reduction of health-related variables describing sub-

jective health discomforts a classical principal component analysis was used with varimax rotation and then in promax oblique solution.

The basic data analysis was performed using cluster analysis, the method of multivariate hierarchical grouping, the so called joining-tree clustering with Euclidian distances. The eventual number of clusters was determined on the basis of the indicators obtained by the cluster variance analysis from the software package Statistica (square Mahalanobis cluster distances and F-values and probabilities of cluster differences). For each cluster obtained in such a way, the values of the variables were determined to describe the cluster. The data were processed with the data analysis standard procedures in software package Statistica (StatSoft®).

Results

The following results were obtained.

Reversely scaled variables (Table 2) are the indicators of self-perceived health status, that is health discomforts, and the variable *reasons for absence of sporting activities* (SPNONINV), meaning the lower value is the better score.

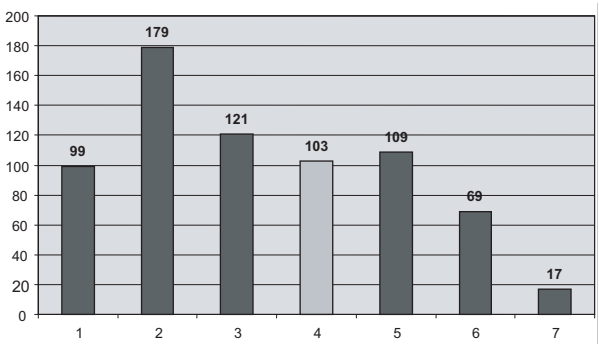

Figure 1. The most frequent ways of spending free time. (1=Additional job, 2=Family, 3=Café, 4=Sport, 5=TV, 6=Additional education, 7=Others)

Table 2. Basic informative indicators of the variables (the poorer indicators are marked with "-", and the better ones with "+")

VARIABLE	Mean	MIN	MAX
OAGE	36.31	19	67
OMARR	0.68	0	1
ONOCH	1.48	0	7
OWORK	14.57	0	43
OSATJOB	2.44	1	3
OSATINC	1.89	1	3

VARIABLE	Mean	-	+
SFREEAS	1.98	1	3
SFREEPL	2.08	1	3
SFREEWA	7.81	1	21
SSPORT	2.05	1	3
SFREESP	2.55	1	3
SFREEIF	2.68	1	3
SPNONINV	0.86	**3**	**0**
SSPINVEST	2.44	1	3
SINTER	1.88	1	7

VARIABLE	Mean	-	+
ZSTRESS	2.02	**1**	**3**
ZSTRRED	2.74	1	3
ZHEASAT	2.39	1	3
ZACTHEAL	2.84	1	3
ZINFOR	2.72	1	3
ZINFSOUR	1.00	0	3
ZMEDICA	2.67	**1**	3
ZACTLEV	1.76	0	3

VARIABLE	Mean	-	+
TSLEEP	0.88	**3**	**0**
TTENS	1.29	**3**	**0**
TNER	1.39	**3**	**0**
TANGER	1.29	**3**	**0**
TFEAR	0.74	**3**	**0**
TANX	0.79	**3**	**0**
TREST	0.86	**3**	**0**
TTIRED	1.56	**3**	**0**

VARIABLE	XA	-	+
TVERT	0.70	**3**	**0**
THEAD	1.22	**3**	**0**
TBACK	1.17	**3**	**0**
TLEG	1.10	**3**	**0**
TSTOM	0.94	**3**	**0**
TWEIGHT	0.93	**3**	**0**
TBLPRESS	0.80	**3**	**0**

VARIABLE	XA	+	-
PGENTEN	0.00	-1.82	2.46
PSOM	0.00	-1.60	2.61
PANX	0.00	-1.46	2.86
PEXCST	0.00	-1.64	2.60

Legend: OAGE - age, OMARR - marital status, ONOCH - number of children, OWORK - work experience, OSATJOB - satisfaction with job, OSATINC - satisfaction with income, SFREEAS - free time amount, SFREEPL - free time planning, SFREEWA - way of spending free time, SSPORT - existence of sporting activities in free time, SFREESP - sporting activities in free time organisation, SFREEIF - which sporting activities one would like to participate in if he/she had more free time, SPNONINV - reasons for non-involvement in sporting activities, SSPINVEST - readiness to invest money in free time sporting activities, SINTER - interest in physical activities in probable free time, ZSTRESS - self-assessment of stress, ZSTRRED - self-assessment of knowledge about reducing stress through physical activity, ZHEASAT - satisfaction with health, ZACTHEAL - importance of physical activitiy in health improvement and protection, ZINFOR - information about contribution of physical activity to health, ZINFSOUR - information sources about contribution of physical activity to health, ZMEDICA - medication, ZACTLEV - physical activity level self-assessment, TSLEEP - sleeping badly, TTENS - tension, TNER - nervousness, TANGER - feeling anger, TFEAR - groundless fear, TANX - anxiety, TREST - feeling restless, TTIRED - feeling tired, TVERT - vertigo, THEAD - headache, TBACK - back pain, TLEG - leg pain, TSTOM - stomach-ache, TWEIGHT - being overweight, TBLPRESS - high blood pressure, PGENTEN - general tension, PSOM - general somatic condition, PANX - general anxixty, PEXCST - pain induced by exessive standing

Although the main goal of the article was the clustering of selected indicators, it is also interesting to survey certain phenomena occurring at the level of basic variables. One of such interesting variables displays the most frequent ways of spending free time (SFREEWA). The obtained results indicated the following: most subjects spent their free time with their families, but also they spent a lot of time in cafés and watching TV. A certain number of the subjects were also engaged in either additional part-time jobs, trying to make more money, or in additional schooling, therefore rather few subjects do any physical or sporting activity whatsoever (Figure 1). It is also obvious that even 70.5 % of the subjects chose more than one answer to the question, which was an even more alarming information about their (non)participation in physical activities.

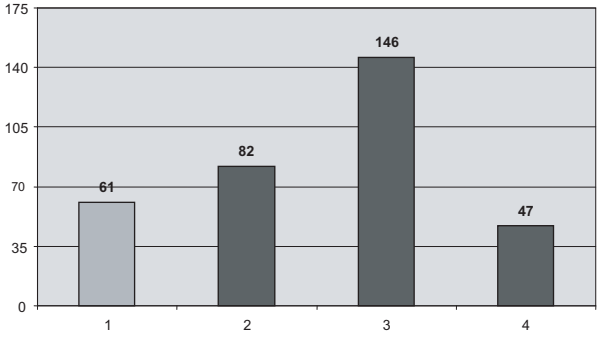

Figure 2. Reasons for non-involvement in sporting activities. (1=Involved, 2=No facility access, 3=Time shortage, 4=Money shortage)

Similar is the variable presenting the reasons *for non-participation in physical/sporting activities* (SPNONINV). The obtained answers indicate that most subjects do not have enough time, a few of them believe they do not have access to facilities, and the fewest of the subjects regard lack of money the reason for their sedentary lifestyle (Figure 2). We can assume that if there were a habit and a need for regular physical activity and sporting engagement, economic factors (financial resources) would be no obstacle for the realization of it. Unfortunately, despite a human's natural, biotic need for physical activity and movement, consequently, despite the awareness that the lack of physical activity will lead to body disintegration, it is obvious that in the observed part of the population making money or gaining material assets is the first on the ranking list, whereas the need to improve and protect one's health is ranked lower. Similar was obtained in the research by Kugler (2006). The most limiting factor in the subjects' engagement in physical activities can be expressed by one motto: *Time is money.*

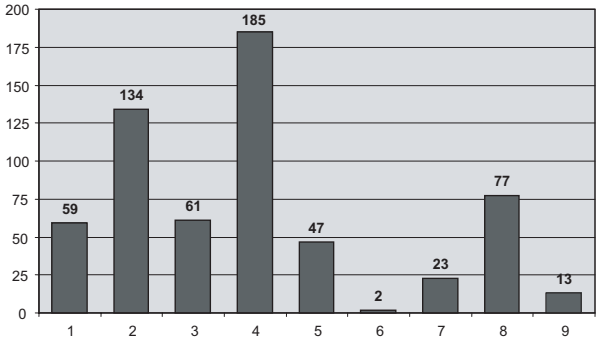

Figure 3. Potential sporting activities in free time. (1=Traditional, 2=Individual, 3=In pair, 4=Sports games, 5=Fitness, 6=New, 7=Martial arts, 8=in water, 9=Sth. else)

It is also interesting to see which activities the subjects would have chosen if they had had enough free time. As presented in Figure 3, most of them would play sporting games (which require a pronounced level of organization – a sport facility, number of participants, locker rooms, etc.). Far fewer of the subjects would join any of the modern physical activity movements, like Pilates, tae-bo, or combat sports, fitness-enhancing programmes, activities with their spouses, or traditional activities, like boccie bowling, nine-pin bowling, traditional sports. Almost satisfactory interest was demonstrated for individual activities and physical activities in water, which is also demanding from the aspect of organization and facility requirements. The manifested pronounced interest in sports games corroborates the previously determined male population preferences for team sports games, primarily for football.

Interesting, but not satisfactory are the answers regarding information sources from which the subjects got an insight into the contribution of physical activity to health improvement and protection. Namely, according to Figure 4, we can be satisfied with 100 answers given by the physical education teachers and 119 suggestions made by medical doctors. However, the fact that in 76 cases such vital information has been given by somebody else, or even worse, that in 63 cases nobody has informed our subjects about the crucial role of physical activity in their life, is a reason for serious consideration. Public media, printed and electronic alike, obviously have a minor role in building the general population's awareness of healthy habits. Namely, most journalists are much more interested in top-level competitive sport and respective events than in the educational aspect of addressing their public. Fortunately, such a trend in western developed countries has been abandoned and authorities from kinesiology or adjacent scientific fields have space to educate the general population on the importance of physical exercise.

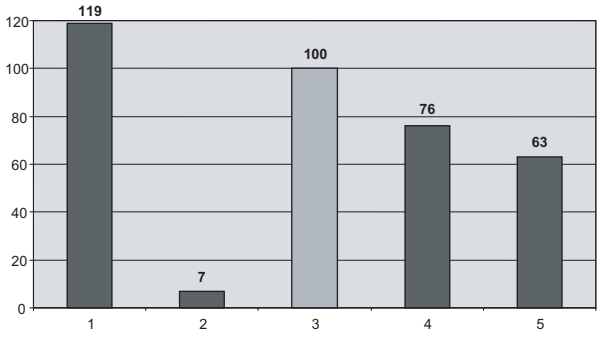

Figure 4. Information sources about importance of physical activity.
(1=Physician, 2=Media, 3=PE teacher, 4=Somebody else, 5=Nobody)

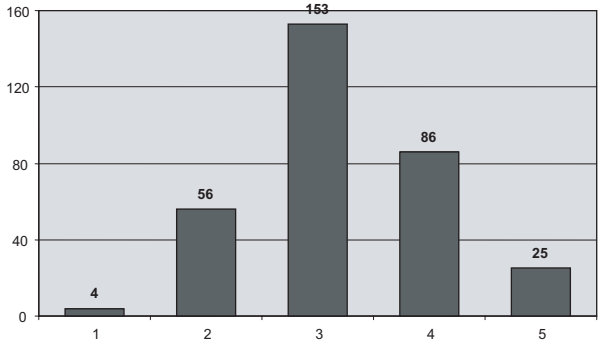

Figure 5. Educational level of the surveyed.
(1=Elementary training, 2=Professional training, 3=Secondary school education, 4=Higher school education, 5=University education)

Finally, we should also pay some attention to the educational level of the subjects (Figure 5). Most of them have finished secondary school, whereas the number of the subjects with higher education (111) was almost twice the number of the subjects with only compulsory elementary schooling or a professional training (60). That may explain the level of information about the health-related aspects of physical activity and fitness.

The results displayed in Table 3 explain the viability of reducing the group of manifest variables assessing health-related discomforts and conditions to the group of latent dimensions because four distinct dimensions were obtained. The first latent dimension encompasses the variables with a common characteristic of enhanced stimulation of the nervous system with a general tendency to tension and impulsive behaviour. The second latent dimension describes a set of self-assessed somatic discomforts, whereas the third latent dimension describes health issues connected to the manifestation of anxiety and overstimuli of the nervous system. The fourth latent dimension embraces discomforts which are predominantly manifested as leg pains and vertigo, usually attributed to people who stand a lot.

It is also obvious that all four dimensions are highly correlated, meaning there is a tendency in all the groups of parameters to one general model of health-related discomforts and conditions – all the listed discomforts and conditions share a psychosomatic characteristic in which psychological loads prevail and physical loads are missing.

The applied methods (Tables 4, 5 and 6) resulted in the six well-defined clusters which are mutually distant enough to prevent any doubt about their

Table 3. Oblique rotation of the factorial pattern of 15 health-discomfort variables and correlations of the factors (significance of projections and correlations=$R_{99\%}$>0.143)

	PGENTEN	PSOM	PANX	PEXCST
TSLEEP	0.37	0.07	0.03	0.17
TTENS	0.83	-0.12	0.04	-0.12
TNER	0.74	0.12	0.06	-0.26
TANGER	0.49	-0.06	-0.01	0.29
TTIRED	0.09	0.60	0.03	-0.11
THEAD	-0.11	0.38	0.05	0.24
TBACK	0.00	0.53	-0.01	0.07
TZEL	0.16	0.48	-0.08	0.05
TWEIGHT	-0.15	0.49	0.05	0.11
TBLPRESS	-0.03	0.65	0.10	-0.10
TFEAR	0.03	0.25	0.55	-0.05
TANX	0.00	-0.28	0.63	0.46
TREST	0.04	-0.05	0.78	0.02
TVERT	-0.06	0.10	0.25	0.50
TLEG	0.20	0.06	-0.48	0.80
	PGENTEN	PSOM	PANX	PEXCST
PGENTEN	1.00	0.87	0.90	0.87
PSOM		1.00	0.90	0.92
PANX			1.00	0.90
PEXCST				1.00

Legend: TSLEEP - sleeping badly, TTENS - tension, TNER - nervousness, TANGER - feeling anger, TFEAR – groundless fear, TANX - anxiety, TREST - feeling restless, TTIRED - feeling tired, TVERT - vertigo, THEAD - headache, TBACK - back pain, TLEG - leg pain, TSTOM - stomachache, TWEIGHT - being overweight, TBLPRESS - high blood pressure, PGENTEN – general tension, PSOM – general somatic conditions, PANX – general anxiety, PEXCST – excessive standing.

Table 4. Squared Mahalanobis' distances of clusters

	CL01	CL02	CL03	CL04	CL05	CL06
CL01	0.00	31.19	109.24	3.98	17.92	12.52
CL02	31.19	0.00	41.14	6.50	36.60	43.89
CL03	109.24	41.14	0.00	33.40	7.44	9.72
CL04	3.98	6.50	33.40	0.00	3.87	5.62
CL05	17.92	36.60	7.44	3.87	0.00	0.26
CL06	12.52	43.89	9.72	5.62	0.26	0.00

Table 5. F-values of the differences between clusters

	CL01	CL02	CL03	CL04	CL05	CL06
CL01	--	192.63	328.25	21.74	40.21	30.41
CL02	192.63	--	146.54	49.59	92.96	121.99
CL03	328.25	146.54	--	110.59	13.17	18.31
CL04	21.74	49.59	110.59	--	9.33	14.74
CL05	40.21	92.96	13.17	9.33	--	0.40
CL06	30.41	121.99	18.31	14.74	0.40	--

Table 6. Probabilities of cluster differences

	CL01	CL02	CL03	CL04	CL05	CL06
CL01	--	0.00	0.00	0.00	0.00	0.00
CL02	0.00	--	0.00	0.00	0.00	0.00
CL03	0.00	0.00	--	0.00	0.00	0.00
CL04	0.00	0.00	0.00	--	0.00	0.00
CL05	0.00	0.00	0.00	0.00	--	0.88
CL06	0.00	0.00	0.00	0.00	0.88	--

existence. The only exceptions are the fifth and the sixth cluster which displayed a certain mutual similarity due to which they might be equalized to some extent. However, since both differ individually from the other clusters, their existence might be regarded as viable. Total Rao F-test of the differences (39.07), with the degrees of freedom of df1 = 30 and df2 = 1324, indicates a probability of $p < 0.0001$.

Table 7. Original and standardized values of variables across the clusters and in total

G	CL01	CL02	CL03	CL04	CL05	CL06	TOT
N	58	112	28	81	19	21	319
%	18.18	35.11	8.78	25.39	5.96	6.58	100.00
OAGE	36.22	38.63	28.89	36.52	45.53	24.86	36.31
OMARR	0.64	0.88	0.39	0.67	0.89	0.00	0.68
ONOCH	1.33	1.94	0.54	1.42	2.53	0.00	1.48
OWORK	14.25	17.55	5.98	15.52	22.29	0.38	14.57
OSATJOB	2.64	2.50	2.25	2.59	2.26	1.43	2.44
OSATINC	2.05	1.85	1.75	1.96	2.00	1.48	1.89
SFREEAS	2.09	1.89	1.71	1.88	2.05	2.81	1.98
SFREEPL	2.14	2.26	1.93	2.05	1.53	1.71	2.08
SFREEWA	10.90	9.31	4.29	6.48	4.32	4.24	7.81
SSPORT	2.36	2.15	1.68	1.89	1.63	2.14	2.05
SFREESP	2.81	2.88	2.07	2.16	2.26	2.43	2.55
SFREEIF	2.97	2.94	2.54	2.42	2.11	2.29	2.68
SPNONINV	0.57	0.91	1.00	0.95	0.95	0.81	0.86
SSPINVEST	2.76	2.69	2.04	2.07	2.11	2.43	2.44
SINTER	2.05	2.22	1.79	1.62	1.16	1.43	1.88
ZSTRESS	2.17	1.94	1.82	2.12	2.05	2.24	2.04
ZSTRRED	2.93	2.89	2.46	2.46	2.37	2.57	2.70
ZHEASAT	2.50	2.38	2.32	2.40	1.95	2.52	2.38
ZACTHEAL	3.00	2.94	2.64	2.78	2.68	2.81	2.86
ZINFOR	2.81	2.95	2.75	2.49	1.79	2.86	2.71
ZINFSOUR	1.29	1.12	0.93	0.84	0.11	0.95	0.99
ZMEDICA	2.76	2.65	2.57	2.65	2.26	2.71	2.65
ZACTLEV	1.84	2.04	0.71	1.63	1.11	2.10	1.73
PGENTEN	-1.17	0.54	-1.08	0.56	-0.87	0.40	0.00
PSOM	-1.22	0.57	-1.06	0.63	-1.10	0.30	0.00
PANX	-1.24	0.56	-1.11	0.58	-0.98	0.56	0.00
PEXCST	-1.25	0.58	-1.10	0.63	-1.09	0.38	0.00

G	CL01	CL02	CL03	CL04	CL05	CL06	TOT
N	58	112	28	81	19	21	319
%	18.18	35.11	8.78	25.39	5.96	6.58	100.00
OAGE	-0.01	0.29	-0.91	0.03	1.13	-1.41	0.00
OMARR	-0.10	0.43	-0.62	-0.04	0.45	-1.47	0.00
ONOCH	-0.11	0.33	-0.69	-0.04	0.76	-1.08	0.00
OWORK	-0.04	0.35	-1.01	0.11	0.90	-1.66	0.00
OSATJOB	0.30	0.09	-0.29	0.23	-0.27	-1.54	0.00
OSATINC	0.22	-0.06	-0.19	0.10	0.15	-0.57	0.00
SFREEAS	0.14	-0.11	-0.34	-0.13	0.10	1.07	0.00
SFREEPL	0.09	0.27	-0.21	-0.04	-0.79	-0.52	0.00
SFREEWA	0.57	0.28	-0.65	-0.25	-0.65	-0.66	0.00
SSPORT	0.54	0.18	-0.64	-0.28	-0.72	0.16	0.00
SFREESP	0.42	0.54	-0.76	-0.62	-0.46	-0.19	0.00
SFREEIF	0.53	0.48	-0.28	-0.49	-1.08	-0.74	0.00
SPNONINV	-0.62	0.10	0.29	0.19	0.18	-0.11	0.00
SSPINVEST	0.51	0.39	-0.63	-0.57	-0.52	-0.01	0.00
SINTER	0.15	0.31	-0.09	-0.24	-0.66	-0.42	0.00
ZSTRESS	0.19	-0.16	-0.33	0.12	0.01	0.29	0.00
ZSTRRED	0.41	0.34	-0.42	-0.43	-0.59	-0.23	0.00
ZHEASAT	0.22	-0.01	-0.11	0.02	-0.80	0.26	0.00
ZACTHEAL	0.39	0.21	-0.59	-0.22	-0.48	-0.14	0.00
ZINFOR	0.16	0.38	0.06	-0.36	-1.50	0.23	0.00
ZINFSOUR	0.44	0.18	-0.09	-0.22	-1.29	-0.06	0.00
ZMEDICA	0.20	0.01	-0.13	0.02	-0.69	0.12	0.00
ZACTLEV	0.13	0.35	-1.16	-0.12	-0.71	0.41	0.00
PGENTEN	-1.17	0.54	-1.08	0.56	-0.87	0.40	0.00
PSOM	-1.22	0.57	-1.06	0.63	-1.10	0.30	0.00
PANX	-1.24	0.56	-1.11	0.58	-0.98	0.56	0.00
PEXCST	-1.25	0.58	-1.10	0.63	-1.09	0.38	0.00

Legend: OAGE - age, OMARR - marital status, ONOCH - number of children, OWORK - work experience, OSATJOB - satisfaction with job, OSATINC - satisfaction with income, SFREEAS - free time amount, SFREEPL - free time planning, SFREEWA - way of spending free time, SSPORT - existence of sporting activities in free time, SFREESP - sporting activities in free time organization, SFREEIF - which sporting one would like to participate in if he/she had, SPNONINV - reasons for non-involvement in sporting activities, SSPINVEST - readiness to invest money in free time sporting activities, SINTER - interest in physical activities in probable free time, ZSTRESS - self-assessment of stress, ZSTRRED - self-assessment of knowledge about reducing stress through physical activity, ZHEASAT - satisfaction with health, ZACTHEAL - importance of physical activitiy in health improvement and protection, ZINFOR - information about contribution of physical activity to health, ZINFSOUR - information sources about contribution of physical activity to health, ZMEDICA - medication, ZACTLEV - physical activity level self-assessment, PGENTEN – general tension, PSOM – general somatic conditions, PANX – general anxiety, PEXCST – excessive standing.

The variables containing self-assessments of the obvious health issues (PGENTEN, PSOM, PANX, PEXCST) were obtained as factors resulting from the previously applied factor analysis, so the data of these dimensions are already standardized due to which the results presented in Table 7 are identical on both sides as opposed to other variables.

The results of the cluster analysis are extremely interesting from the aspect of chronological age definitions, and especially from the aspect of indirect monitoring of characteristics within seemingly homogeneous samples. Therefore, the clusters will be presented in the order arranged according to the average chronological age of each cluster, starting from the youngest age group, and not in order of their origin.

So, ***the sixth cluster*** (CL06) encloses 7 % of the surveyed subjects. It is simply constructed. The average age of the subjects in this sample is 24.8 years. They are obviously the youngest subjects in the entire sample, with no family obligations and with barely any work experience (0.4 year), but they are not satisfied with their employment status or with their income. They spend their free time mostly in cafés or coffee shops or in front of TV (low values of SFREEWA). They do not feel any stress issues (ZSTRESS), have no prescribed medication (ZMEDICA), and they are satisfied with their health status (ZHEASAT). Their self-evaluation is that they are physically active. However, this "ideal" picture of young and "light-hearted" people is spoiled, unexpectedly, by the indicators of health discomforts and conditions that are on a considerably high level when compared to the whole sample.

The third cluster (CL03) embraces 9 % of the observed subjects of the average age of 28.9 years, mostly with no marital or parental obligations. The subjects located in this cluster demonstrate negative values in every variable related to the blocks of free time and activity, especially in the variables: *free time* (SFREEAS), *organization of activities in free time* (SFREESP), *reasons for non-involvement in sporting activities* (SPNONINV) and *money investment in physical activity* (SSPINVEST). They feel high stress (ZSTRESS), they are not physically active (ZACTLEV), but they believe that physical activity has no importance in health improvement and protection (ZACTHEAL). The author was fairly surprised to find out that they do not feel any health discomforts (PNEM, PSOM, PANX, PEXCST).

The first cluster (CL01) covers 18 % of the subjects and is most conspicuos in the entire sample from the aspect of the physical activity of the individuals. An average age of the subjects is 36.2 years; most of them are married, but have a smaller number of children. These subjects have no negative value in the variables related to self-evaluation of free time and physical activity! They have demonstrated a series of positively oriented elements in their perception of non-working time and of for-health-preservation-important physical activity. It is especially obvious that they spend much time in physical exercise and that they scarcely take medications. They also do not feel any health-related discomforts.

The fourth cluster (CL04) embraces 25 % of the subjects, with an average age of 36.5 years; most of them are married and have a smaller number of children. According to this, they seemed similar to the previously described subjects of the first cluster. However, one can easily see that all the variables describing this cluster are of moderate values in comparison to the other clusters, except for the values of the variables related to health discomforts which are the highest in the entire sample.

The second cluster (CL02) contains the most subjects – 35 %, with an average age of 38.6 years. Most of these subjects are married and have many children. They also have considerable work experience (17.6 years on average). Among the highest indicators the following can be singled out: *intentions to plan* (SFREEPL) and *organize* (SFREESP) their *free time*, and numerous activities they would be involved in if they had enough time (SINTER), as well as their good insight into the importance of exercise for health improvement and protection (ZINFOR). Several other indicators are also positive and they complete the image of subjects who strongly feel the need to engage in physical exercise or sporting activities (SFREEWA, SFREEIF, SSPINVEST, ZSTRRED, ZACTHEAL, ZACTLEV). However, their health-related discomforts are strongly manifested (almost like in the subjects of cluster CL04), almost maximally in comparison to the other clusters.

The fifth cluster (CL05) subsumes 6 % of subjects with an average age of 45.5 years. These subjects are the oldest in the sample, married and have a larger number of children. In general, they are satisfied with their income, but they are not satisfied with their jobs. They have no intentions to plan their free time, no physical activity exists in their lives; they would not do any sporting activity even if they had more free time; they regard physical activity as having no importance in stress relief or in health improvement and protection; they take a lot of medications and their level of information about physical activity importance is poor. They will never invest any money in sporting activity participation, and they are usually passive in their free time (cafés and TV). These subjects hardly feel any health discomforts (despite the fact that they take a lot of medications); in this variable they are similar to the subjects of the third cluster.

Additionally, the author would like to draw attention to the educational level, which is not an ex-

plicit indicator, but a qualitative feature which may direct us to certain obvious facts. The subjects of the second cluster had the highest average level of education (the subjects are among the oldest in the sample - 38.6 years) followed by the subjects of the third cluster (age 36.2 years). The lowest level of education was registered for the subjects of the sixth (the youngest in the sample – 24.9 years) and the fifth cluster (45.5 years).

The insight into the initial raw data for the subjects that had moderate and high either positive or negative projections on individual clusters corroborated the presented results, meaning that the extracted clusters were maximally reliable and that their existence was not a result of the position of outlayers which might have distorted the hyperelypsoid by which the clusters were defined.

Discussion and conclusions

The results shown in the previous chapter indicate that physical exercise participation is a function of several determinants – the level of awareness in the broad population of adult men that physical activity is crucial in health preservation and improvement, social status, material status, self-engagement, level of information and similar.

Without ***personal commitment and strong motivation*** an individual will hardly find any free time, opportunity and interest for doing, not only, sporting or recreational activities, even when she/he is aware that such activities may considerably contribute to her/his health preservation and improvement (McAuley, 1993; Sherwood & Jeffery, 2000; Malina, 2001a,b; Andrijašević, Paušić, Bavčević, & Ciliga, 2005). It is also well known that participation in adequate regular, chronic, organized recreational exercise programmes is strongly influenced by the awareness about the health-enhancing importance of physical activity which is formed mostly during regular schooling in the national educational systems until the age of 19-20 years. Further, ***life experience***, collected in variable ways, is also crucial in forming attitudes towards physically active lifestyle, that is, towards recreational exercise programmes. The clusters obtained in this research are to a great extent determined by information sources, level of awareness, and social status.

The sixth cluster (CL06) obviously includes very young people who have recently finished their formal schooling and do not have any job yet. Their light-hearted feeling of freedom may be explained by the lack of formal obligations (no marriage, children, spouse, etc.) But, under the surface, they appeared to be insecure persons who reported quite a number of discomforts probably provoked by worries about the future and lack of money, on the one hand, and on the other by their passive attitude towards the world, consequently towards sporting or recreational activities as well. They reported a satisfactory amount of free time, but they spent it drinking in cafés or in front of TV. As far as recreational programmes for this group are regarded, the main task would be activation, a "waking-up" of these subjects in order to, practically and directly, show them that there are a lot of various activities which may fill their free time better, allowing a person to express himself through movement, communication and cooperation. To this subsample of the general population the contents should be offered which do not "tie down a participant with too high obligations" and which can be described as adventurous, speedy, dynamic, and variable. Namely, certain research studies (Andrijašević & Bartoluci, 2004) in tourism have shown that persons of a younger age evade organised recreational systems with well-known, predictable contents, no matter how entertaining they might be. Therefore, the following contents are recommendable to the youngest subsample: competition in various sports games and instruction in free-climbing, paragliding, rafting, mountain-biking, scuba diving, or the martial arts. Thematic excursions may also be interesting to this population.

The third cluster (CL03) comprises persons who are interested in keeping their jobs, so they behave like ***yuppies***, trying to prove and establish themselves high at work. It is corroborated by the highest level of education among all the subgroups (most of them have higher education). Therefore, we can understand why they expressed their dissatisfaction with their free time, job and income bracket. Shortage of time is probably the most conspicuous feature in this group. It is very difficult to offer and activate these subjects with adequate recreational programmes. Namely, they must be first "wrenched off" their all-day long working routine, to which they will not easily agree because in their work they seek probable solutions for their problems (most frequently financial- and social status-related) that already exist or are seen in the near future (marriage, children, etc.). Organized activities in the premises in the vicinity of their work places, like fitness gyms, weight rooms and activities such as sports games, may be good weekly substitutions for some other physical activities. These exercise programmes must integrate the system of education which will enable the participants to become acquainted with the importance and character of various exercise programmes, proper eating habits and their contribution to health protection and improvement. All these messages must be underlined by the message about their personal responsibility to the quality of life. During weekends it would be recommendable to organize modern outdoor programmes for them, like team building, rafting, trekking, etc.

The first cluster (CL01) may be regarded as a hypothetical continuation of the described situation.

It embraces subjects who succeeded in "promoting themselves" to a certain "status", either at work or in society, but who neither aspire very high nor are extremely ambitious. Somewhat lower expectations might be attributed partially to the somewhat higher education level of these subjects. On the other hand, they have much free time at their disposal which they dedicate to physical exercise; they are well informed and very active. It seems that we are dealing here with ***former athletes-competitors*** or with subjects who proceed with their engagement in sport. The answers to the question: Which sport were or are you engaged in?, confirm such an interpretation; as many as 69 % of the members of the first cluster reported football or other sports games participation. Namely, it is well known that six-a-side-football matches or tournaments, as well as a series of spontaneous, unofficial football or basketball matches or duels of two-on-two or three-on-three are rather frequent, and they are not too demanding from the aspect of organization. No special offer is needed for these subjects because they have already acquired the habits of chronic, regular exercising or doing their sports. Maybe it would be beneficiary to offer certain physical activity programmes that would recruit their less pronounced or used capacities. This subsample should be provided with regular conditions for their participation in sports games, and, because of their age, the natural psycho-somatic negative changes of ageing and their proneness to injuries, their health status should be preventively checked once or twice a year. For this part of the male population the most important will be education in fitness preservation and health protection. It is also advisable to add goal-oriented physical activities and exercise programmes to sport games.

However, what should we do with the adult men at this age who are not former athletes and who have not developed the habit of regular physical exercise? These are probably described by ***the fourth cluster*** (CL04) – these subjects most probably are stuck in a kind of routine. In general, they are not too satisfied with their jobs or income, but have many reasons for not finding any motive to commence their serious engagement in sports or physical exercise. Despite the wide range of their interests in many things, the results in this study indicate they are the most passive group of all the surveyed men – literally, they have no ambition to face seriously the issues of their lives. They just exist, almost invisible, probably hoping to slip somehow through life. But, their slipping through life is jeopardised by many expressed, self-reported health discomforts (the highest values of discomforts in the entire sample). These subjects need special recreational intervention programmes consisting primarily of sets of corrective exercises and educational components. Such complex programmes can be designed and conducted exclusively by highly trained expert kinesiologists or a team of experts to accomplish the planned goals. The members of this cluster need a strong impetus for their motivation to get started.

If we feasibly assume that the described status is continued through years, most of the subjects will try to change their lifestyle, either self-incited, or encouraged by their spouses, children, friends, colleagues, or physical recreation experts. Such a picture can be seen in the variables describing ***the second cluster*** (CL02). The status is similar to the previously described latent dimension, but there are also certain crucial differences. Namely, these subjects still do not have as much free time as they wish and their health discomforts are fairly expressed. However, they are well i***nformed*** and active persons, with a fairly high level of education, who know what they want – planned and well-organized free time consisting of various sporting activities, and if needed, they are prepared to pay for it. They would not choose any special activities; they reported the largest number of various contents they would have chosen to be involved in if they had had enough work-free time. This indicates a sort of turning point of their lives. Besides, they are at the age (39 years) when basic life providing means have already been ensured and their children are, probably, becoming independent, so the pressure coming from the family is not very high any more. That allows them to plan for a "new" future – they seek new, life-quality-enhancing values, with physical activity assuming the central position. It is not always simple to achieve the established goals because deep-rooted habits should be modified first. If kinesiology experts respect the principles of physical recreation programme implementation (adaptation rate, progressive graduation of loads), they will be able, with the addition of educational communication, to incite certain changes in the recreation participants' attitudes and behaviour. Recreational programmes for such people should be built on the contents inducing positive mood changes, and must be realised through work in smaller groups.

The population subgroup, isolated as the ***fifth cluster*** embracing the oldest members of the sample, is almost an ideal sequel to the behaviour and attitude patterns of younger age-clusters, except for the subjects that might be regarded as former athletes. It is characteristic for the fifth cluster members to have plenty of spare time, but they do not want either to make plans or to organize any sporting activity in it; they are not physically active at all and decline any possibility to become more active in the future. In addition, they are poorly informed about the health enhancing and protecting values of physical activity and exercise. This is a group of medium educated persons who can be described as "***relaxed***" – they are fairly satisfied with

their present status and probably seek pleasure in something else, for example, in their grandchildren. Namely, they are at the age when at least one of their numerous children has probably given birth to a grandchild, thus introducing new contents into their lives. They do not feel any of the listed health discomforts and they can be recognized as very quiet and not very active persons. However, such a situation should not be accepted as definite – namely, the years that are to come can bring many health-related issues and endanger their ability to live independently if they continue with such a passive way of living. A lot of systematic animation, informative and entertaining programmes should be offered to the fifth cluster members, like boccie bowling, table tennis, miniature golf or the like. Further, all kinds of excursions (hiking, picnic, walking; with the family preferably), the aim of which is to bring them in contact with nature, are welcome, as well as are organized competitions in traditional sports. Of course, well-programmed, adequate physical exercise programmes are indispensable for people of this age, but only under strict health status control, meaning that a lot of attention should be paid to the initial status diagnostics, as well as to the monitoring of transitive states and to any necessary programme adjustments.

The issue noticeable throughout the investigated sample and all age strata, with the exception of the third cluster, is an obvious lack of proper information about physical exercise and activity being an important factor in life-quality enhancement and health protection, on the one hand, and on the other, the evident passive, consuming-absorbed attitude to free time, inertness which leaves hardly any room for any change, especially in the sense of introducing more physical effort into everyday living. The exceptions are the members of the third cluster who have acquired the habit of chronic, regular exercising at an earlier age and who appreciate physical activity due to its physical, health, and social usefulness. As regards the rest of the population in the sample, in which no endogenous or exogenous factors exist that can initiate gross changes towards a more active lifestyle, well-elaborated, well-advertised quality external interventions of kinesiology experts are needed if any physical activity is to be introduced into their lives.

Kinesiology experts have a key role in the implementation of various physical exercise or sporting programmes. Their interventions, however, must be integrated into the general developmental strategy of a particular region, for which policy makers and local authorities are responsible. This implies investments in sports facilities, their construction and maintenance, in municipal and local natural resources development and protection (parks, promenades, footpaths, hiking paths, mountain tracks, resorts, beach areas, etc.), in the employment of experts, and last, but by no means the least important, in the promotion of an active lifestyle throughout the life span. Far-reaching intervention strategies, corroborated by this research as well, are needed to confront the epidemic of sedentary lifestyle. Education for active and responsible living in the surveyed sample was evidently neglected in every way. Mass media, TV first among many, can help in correcting this years-long negligence by promoting the advantages of physically active living and recreational sporting activities. Recent world trends indicate the importance of physical activity, not only as a health enhancing and protecting factor, but also as a specific cultural and social phenomenon.

This study has provided some preliminary evidence for the feasibility and value of using a cluster method approach to the identification of typologies of thr adult male population. Distinct groups were located and described by their age and leisure-time preferences. Importantly, this study has also identified two clusters of men (the fifth and the sixth cluster) with very low levels of physical activity participation which has already been generalized, or will, sooner or later, be generalized across their lives, thus deteriorating the quality of life. Therefore, these population subgroups should be extremely carefully approached with intervention programmes. Free time contents should be offered to them that will meet their needs and preferences, but these contents must also meet the following two criteria: 1) they must not additionally engage bodily functions that have already been exposed to stress in their professional work, and 2) the programmes must not, in principle, provoke any health-risking situations, because any injury, no matter how small, will prevent the participants from fulfilling their professional duties.

Once identified and confirmed, a more comprehensive needs analysis of the clusters can be undertaken with regard to the health behaviour of interest, which is in this case physical activity participation. Intervention programmes can then be designed, piloted and subsequently refined and their efficiency assessed through experimental investigations. In this sense the questionnaire proved useful in its first step – the definition of population subgroups. The first results indicate that the applied questionnaire is a good tool for clustering subpopulation groups according to age and interests.

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