Original Article

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Physical activity level and mediterranean diet adherence evaluation in older people - observational, uncontrolled, pilot study

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Abstract

WHO recommend to associate a proper dose of movement with healthy and balanced diet, also in elderly. Promoting healthy lifestyles and adopting healthy habits can lead to a successful aging. The Mediterranean diet model is considered the gold standard nutritional treatment in some Non Communicable Diseases and the evaluation of adherence to this diet becomes essential to study the lifestyle of the population in order to prevent the risk of onset of age-related chronic diseases. In order to implement appropriate interventions for successful aging and to prevent functional alterations affecting the people autonomy in Activities of Daily Living, the LIFestyle of the Elderly in Umbria Population Project (LIFEUP) was promoted in 2018, in Italy. 36 subjects were invited to fill out self-report questionnaires used to assess health status and quality of life (EuroQol), physical activity levels (IPAQ) and Mediterranean diet adherence (MED Diet Score). Anthropometric variables (height, BMI), body composition and functional capacities (through Senior Fitness Test battery) were studied. We observed a situation of overweight (average BMI=27.4) with fat mass=30.45% and low total body water 47.64%), with a medium adherence to the Mediterranean diet (Score=7.19). Furthermore, we noted a good health status perceived (71,14/100), and acceptable physical activity levels (36.55 MET/h/week), and good functional capacities (2 minutes steps average=86.73; chair stands average=14.09; 8-foot up and go test average=6.47 sec.), according to international guidelines and standard ranges for this age. This pilot study gave an overview of a small group of the elderly Umbrian population to implement prevention and health promotion plans among the elderly.

Keywords: Physical activity levels; functional capacities; Mediterranean diet adherence; older people; nutritional habits

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INTRODUCTION

In the elderly, an appropriate amount of physical activity should be associated to correct eating habits in order to achieve a good quality aging, [1] with a preserved degree of self-sufficiency in the activities of daily living [2]. Moreover, according to the results of the *Passi d'Argento* survey [3], providing detailed information on the habits and lifestyle of the Italian elderly population aged 65 and over, promoting a healthy lifestyle and reducing the behavioural risk factors for chronic non-communicable diseases (sedentary lifestyle, incorrect diet, smoking and alcohol abuse) is an essential goal to achieve an active and healthy aging [4].

In prevention, the practice of physical activity is of fundamental importance to maintain a good state of health and the WHO advises elderly subjects (over 65 years of age) to practice moderate physical activity for at least 150 minutes a week [5]. Even where health conditions make it difficult to carry out some activities physical, people of this age group should be physically active for as long as be possible for them [5].

An healthy and balanced diet must be associated with the right amount of movement. Worldwide recognized by Unesco as an "intangible heritage of humanity" [6], the Mediterranean diet (MED) is characterized by a perfectly balanced combination of seasonal fruit and vegetables, fish, whole grains, legumes, extra virgin olive oil, with a moderate consumption of white meat, dairy products and red wine [7]; the MED provides an appropriate amount of macro- and micronutrients to cope with the physiological changes of advancing age and avoid malnutrition [8] .

Several studies, such as the Seven Country Study, have shown a direct relationship between the adherence to the MEDA and a reduced in the risk of death from all causes, including cardiovascular diseases (CVD) and cancer [9]. MED has been proposed as the gold standard nutritional treatment for prevention of CVD, diabetes mellitus, some forms of cancer obesity [9-11] and neurodegenerative diseases such as Dementia and Alzheimer's [12].

The LIFestyle of the Elderly in Umbria Population Project (LIFEUP) was started in 2018 with the aim of promoting lifestyle and behavioural interventions for a successful aging in the Italian region of Umbria. The project consisted in two educational meeting in the University of third age headquarters about healthy lifestyle; moreover some questionnaires were administrate and some simple, validate, measurements were executed.

This research aims to investigate the lifestyle habits, state of health and quality of life and physical abilities of a small sample of the elderly Umbrian population, also in order to implement future interventions aimed at successful aging. In this article, we showed the preliminary results of the LIFEUP pilot study, focusing on physical activity level and physical performance. Furthermore, a survey on adherence to the MED was conducted. Finally, state of health and quality of life, measured through questionnaires, were presented.

MATERIAL AND METHODS

Participants

From November to December 2018, 36 volunteers older adults (7 men and 29 women, mean age = 75.81 ±8.4 years) participated in LIFEUP pilot study.

Inclusion criteria were: to be older adult male and female subjects, aged ≥65 years, members in activities organized by University of the Third Age of Perugia. The exclusion criteria were: presence of conditions that contraindicate the performance of functional capacity assessment tests and the presence of health conditions that prevent participation in the proposed activities; failure to provide written informed consent.

The study was conducted in compliance with the guidelines laid down in the Declaration of Helsinki and it was approved by the University Committee of Bioethics of University of Perugia in the proceedings of the session of 25.2.2020 (protocol number 2019-40). All the research data were stored anonymously in electronic worksheets, accessible only to personnel in charge of research tasks within the Project.

Participants signed an informed consent to be included in the study and to the anonymously processing of personal data. To collect some self-report measures, we asked participants to fill out some questionnaires. Moreover, all participants underwent a functional assessment, including anthropometric and body composition parameters and physical performance measures.

Measures

Anthropometric Measures. Height, weight, waist circumference (WC) and body mass index (BMI) were measured for all participants, using standard technique [13]. Height was determined using portable stadiometers Seca 213 I (Seca, Hamburg, Germany). Measurements of weight and body composition (percentage of total body water or %TBW, lean mass or FMM, fat mass or FM, muscle mass or MM, Basal Metabolic Rate or BMR, bone density or BM and ideal body weight or IBW) were performed by the TANITA body composition analyser BC-420MA (Tokyo, Japan); WC was measured with the individual in standing position at the end of expiration, through Seca 203 Circumference Measuring Tape (Seca, Hamburg, Germany). The BMI was calculated as weight (kg)/(height (m)^2.

Self-Report Questionnaires Measures. A General Form was used to collect socio-demographic information (educational level and status of employment), marital status, as well as the lifestyle habits. Furthermore, we assessed:

I. physical activity levels (PAL) practiced and the perception of fun due to this practice, through IPAQ-short form questionnaire [14] and Physical Activity Enjoyment Scale or PACES [15], respectively. The first, measures the type and amount of physical activity carried out in the last 7 days, as well as the time dedicated to sedentary activities. The second questionnaires evaluated the perception of pleasantness in carrying out physical activity, through 16 items with scores given on a 5-point scale, from 1 (completely disagree) to 5 (completely agree), with a total score range of 16 - 80 points. Higher scores indicate higher enjoyment.
II. state of health and quality of life (QoL), through EuroQol-5D questionnaire (EQ-5D)[16], an instrument made in two parts. The first allowed to investigate 5 areas of health (mobility, personal care, habitual activities, discomfort / pain and anxiety / depression). For each dimension, the questionnaire investigates whether the subject has severe problems, minor / moderate problems or no problems. The answers provided allow to obtain 243 score combinations which can in turn be converted into an EQ-5D index anchored between 0 and 1 (1 = perfect health). The second part includes a Visual analogue scale (VAS), from 0 to 100, on which the subject can indicate his perceived health level.
III. MEDA, through 14-items Mediterranean Diet Assessment Tool [17]. The Italian version of the 14-items Mediterranean diet assessment tool was used, consisting of simple dichotomous questions (YES or NO answer). One point is assigned to each frequency answer that respects the principles of the Mediterranean diet. A total score lower than 5 defines a low adherence to the Mediterranean diet, from 6 to 9 medium adherence, greater than 10 high adherence.

Physical Performance Measures. According to Senior Fitness Test battery or SFT [18], we carried out simple physical performance tests (supervised by a Sports Science Specialists well-versed in physical exercise for older people, with experience in this specific field), which have the purpose of evaluating physical abilities such as muscle strength, aerobic function, flexibility, balance and dexterity. We proposed:

- 30-Seconds Chair Stand Test, to evaluate muscle strength. We recorded the number of times that a subject is able to get up from a chair and return to sitting is counted, in 30 seconds.
- 2 Minutes Step Test, to evaluate aerobic endurance. Were recorded the number of steps, marching on the spot for 2 minutes.
- Chair Sit and Reach test, to evaluate the flexibility of the lower body. In this test, the subject was instructed to reach forward toward the toes by bending at the hip, by the sitting position. We measured the distance between the tip of the fingertips and the toes.
- 8-foot up and go test, to evaluate balance and dexterity. In this test, subjects were invited to get up from the chair, walk as fast as possible, go around the plastic cone located about 2.40 m away and return to sit on the chair, starting from a seated position. Time required was measured.

Statistical Analysis

Descriptive analyses in terms of means and standard deviations were presented for anthropometric measures values, for the entire sample and subsequently sub grouped by gender. Gender comparisons were performed using one-way ANOVA test (table 1).

About Self-Report Questionnaires Measures values, we presented the prevalence (%) of various pathologies declared by participants, classifying them by gender (table 2). For MEDA questionnaires, the EQ-5D questionnaire, health status, PAL (average relating to days, minutes and MET of the physical activity conducted at various intensities) and PACES values we presented the mean and standard deviation (expressed as ± SD) (table 3). Moreover, the MEDA scores were presented according to participants gender and the frequencies (expressed as %) of positive responses given by the participants for each item were showed (figure 1).

Finally, data relating to the physical performance tests used to evaluate strength, aerobic endurance, flexibility of the lower limbs and balance are reported only for the 12 subjects that presented all the variables values (table 4). All gender comparisons were performed using One-way ANOVA test.

A p values ≤ 0.05 were set as statistically significant. All the data have been digitally archived and the analyses were performed using SPSS® Software, version 22.0 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp).

RESULTS

Anthropometric Measures. We observed an overweight status in all group, in fact the mean BMI was found to be 27.94 ± 3.55, with no differences between women and men. For the waist circumference, we observed a mean value of 94.23 ± 10.99, with differences (p=0.012) between women (92.35 ± 10.24 cm) and men (108.67 ± 2.08), values above the risk limit for the onset of metabolic and cardiovascular diseases. All the data are reported in table 1.

Self-Report Questionnaires Measures. From the general form information questionnaire, as regards the personal pathological clinical history, we observed that the highest prevalence is for cases of hypertension and osteoporosis (table 2).

Table 1. Anthropometric measures values for all sample and for gender subgroups.

Variables	All	Man	Women	F	p
Weight (kg)	65.88 ± 11.81	80.13 ± 12.60	63.29 ± 9.88	9.117	**0.006**
Height (m)	1.55 ± 0.08	1.69 ± 0.06	1.52 ± 0.06	28.824	**<0.001**
BMI	27.94 ± 3.55	27.65 ± 2.77	28.00 ± 3.74	0.046	0.832
Waist circumferce (cm)	94.23 ± 10.99	108.67 ± 2.08	92.35 ± 10.24	7.330	**0.012**
WHtR	0.61 ± 0.06	0.65 ± 0.02	0.61 ± 0.06	1.266	0.272
Age	75.81 ± 8.40	75.43 ± 6.50	75.90 ± 8.89	0.017	0.897
Fat (%)	30.47 ± 9.17	25 ± n.a.	30.47 ± 9.17	0.363	0.555
Fat Mass (kg)	19.84 ± 7.43	20 ± n.a.	19. 84 ± 7.43	0.000	0.983
FFM (Kg)	44 ± 7.59	62 ± n.a.	44.00 ± 7.59	8.353	**0.010**
Mm (kg)	41.84 ± 7.34	59 ± n.a.	40.89 ± 6.22	8.031	**0.011**
TBW (l)	30.11 ± 5.73	44 ± n.a.	29.33 ± 4.78	8.929	**0.008**
TBW (%)	47.58 ± 7.10	53 ± n.a.	47.28 ± 7.18	0.602	0.448
Bone Mass (kg)	2.16 ± 0.38	3 ± n.a.	2.11 ± 0.32	7.158	**0.016**
BMR (Kcal)	1299 ± 206.49	1793 ± n.a.	1271.56 ± 173.18	8.589	**0.009**
IBW (kg)	51.53 ± 4.26	62 ± n.a.	50.94 ± 3.52	9.332	**0.007**

BMI = Body Mass Index; Wc= Waist circumferce; WHtR = waist-to-height ratio; FFM = Free Fat Mass; Mm=Muscle Mass; TBW = Total Body Water; BMR = Basal Metabolic Rate; IBW = Ideal Body Weight. F = variance of the group. p values ≤ 0.05 were set as statistically significant. Data are showed as mean ± standard deviation.

Table 2. Prevalence (%) of various pathologies declared by participants.

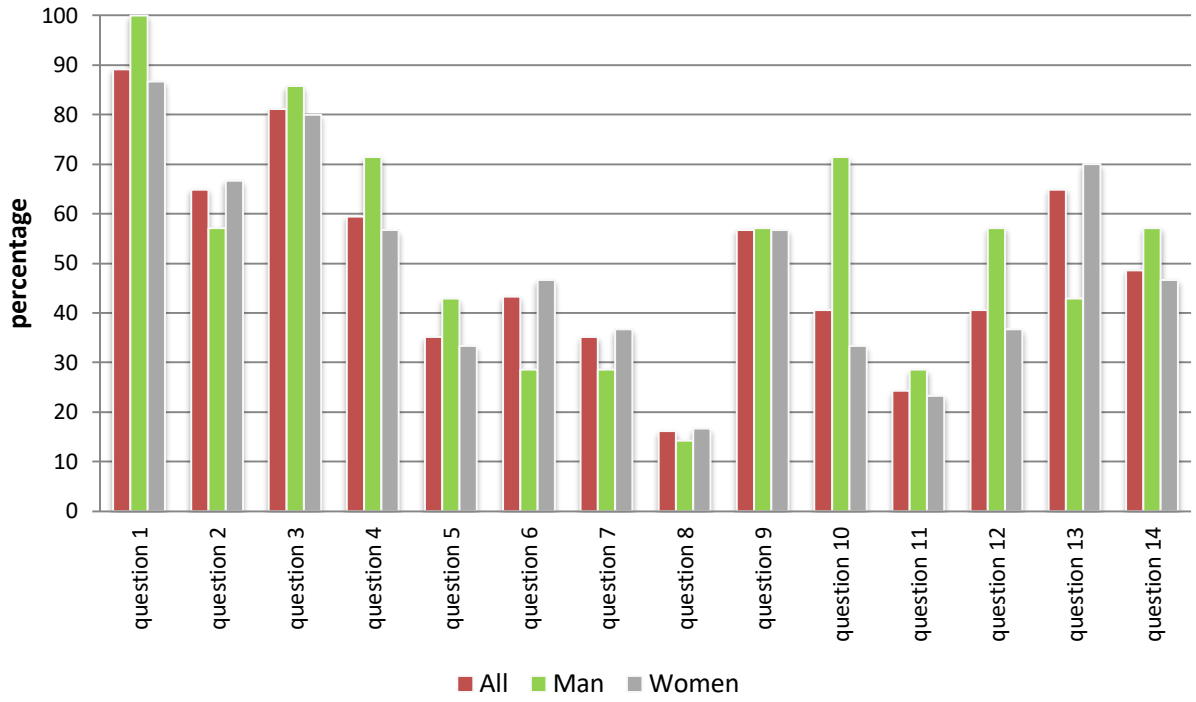
Pathologies	All	Man	Women	F	p
Hypertension	52.8	42.9	55.2	0.327	0.571
Myocardial infarct	5.6	28.6	0.0	10.956	0.002
Diabetes	11.1	28.6	6.9	2.737	0.107
Atrial fibrillation	8.3	14.3	6.9	0.385	0.539
Incontinence	10.8	14.3	6.9	0.084	0.774
Stroke	5.6	0.0	6.9	0.490	0.489
Memory disturbances	2.8	0.0	3.4	0.236	0.630
Osteoporosis	25.0	0.0	31	2.975	0.094
Parkinson's	2.8	14.3	0.0	4.565	0.040
Falls	8.3	14.3	6.9	0.385	0.539
Cancer mammary	13.9	0.0	17.2	1.377	0.249
Colon Cancer	2.8	0.0	3.4	0.236	0.630
Throat Cancer	2.8	0.0	3.4	0.236	0.630
Prostate Cancer	2.8	14.3	0.0	4.565	0.040
Fractures	5.7	14.3	3.6	1.165	0.288
Rheumatoid arthritis	2.8	0.0	3.4	0.236	0.630

Data are showed as percentages. p values ≤ 0.05 were set as statistically significant.

Table 3. MEDA, EQ-5D, health status, PAL and PACES questionnaires values.

Variables	All	Man	Women	F	p
Mediterranean Diet Assessment					
MEDA	7.19±2.7	7.43±0.98	7.14±2.99	0.063	0.803
State of Health and Quality of Life					
EQ-5D	0.917±0.28	1.000±0.00	.897±0.31	0.763	0.389
Vas perceived health level	71.14±17.83	62.14±20.99	73.39±16.61	2.317	0.138
mobility	1.37±0.49	1.14±0.38	1.43±0.50	1.956	0.171
personal care	1.22±0.49	1.14±0.38	1.24±0.51	0.228	0.636
habitual activities	1.25±0.50	1.14±0.38	1.28±0.53	0.392	0.535
discomfort / pain	1.54±0.56	1.43±0.54	1.57±0.57	0.357	0.554
anxiety / depression	1.44±0.56	1.29±0.49	1.48±0.58	0.670	0.419
Physical Activity Levels					
MET-h/week at Vigor	5.59±18.03	2.29±6.05	6.39±19.88	0.286	0.596
MET-h/ week at Mod	18.53±24.04	15.43±13.75	19.28±26.06	0.141	0.710
MET-h/ week at Walk	12.44±14.40	19.73±16.84	10.69±13.50	2.305	0.138
Tot MET-h/ week	36.55±38.50	37.44±22.61	36.34±41.75	0.005	0.947
SED Time of working day (min)	231.64±205.88	528.0±321.43	172.37±109.72	21.012	**<0.001**
SED Time of non-working day (min)	148.79±78.67	204.0±80.50	137.29±74.88	3.210	0.084
Physical Activity Enjoyment Scale					
PACES	61.06±14.79	52.71±23.2	63.31±11.23	3.006	0.093

MET-h/week at Vigor= Energy expenditure of physical activity at vigorous intensity; MET-h/ week at Mod= Energy expenditure of physical activity at moderate intensity; MET-h/ week at Walk= Energy expenditure of walking activity. Tot MET-h/ week=Total weekly energy expenditure. SED Time=sedentary time. Data are presented as mean and standard deviation (expressed as± SD). p values ≤ 0.05 were set as statistically significant.



Question 1. How many times per week do you consume vegetables, pasta, rice, or other dishes seasoned with sofrito† (sauce made with tomato and onion, leek, or garlic and simmered with olive oil)?
Question 2. Do you preferentially consume chicken, turkey, or rabbit meat instead of veal, pork, hamburger, or sausage?
Question 3. How many servings of nuts (including peanuts) do you consume per week? (1 serving 30g)
Question 4 How many times per week do you consume commercial sweets or pastries (not homemade), such as cakes, cookies, biscuits, or custard?
Question 5. How many servings of fish or shellfish do you consume per week? (1 serving 100–150g of fish or 4–5 units or 200 g of shellfish)
Question 6. How many servings of legumes do you consume per week? (1 serving: 150g)
Question 7. How much wine do you drink per week?
Question 8. How many sweet or carbonated beverages do you drink per day?
Question 9. How many servings of butter, margarine, or cream do you consume per day? (1 serving: 12g)
Question 10. How many servings of red meat, hamburger, or meat products (ham, sausage, etc.) do you consume per day? (1 serving: 100–150g)
Question 11. How many fruit units (including natural fruit juices) do you consume per day?
Question 12. How many vegetable servings do you consume per day? (1 serving: 200g [consider side dishes as half a serving])
Question 13. How much olive oil do you consume in a given day (including oil used for frying, salads, out-of-house meals, etc.)?
Question 14. Do you use olive oil as main culinary fat?

Figure 1. Mediterranean diet adherence scores frequencies (expressed as %) of positive responses, for each item.

Table 4. Physical Performance Measures values (n=12).

Variables	All	Man (n=3)	Women (n=9)	F	p
30-Seconds Chair Stand Test	14±3.10	10.67±3.06	15.11±2.32	7.220	0.023
2 Minutes Step Test	86.75±16.67	74.33±7.77	90.89±17.03	2.526	0.143
Chair Sit and Reach test R	1.79±3.13	0.39±1.17	6±3.61	19.204	0.001
Chair Sit and Reach test L	2.21±4.03	0.39±1.17	7.67±4.93	20.010	0.001
8-foot up and go test	6.43±1.42	6.01±0.93	7.70±2.10	4.108	0.070

Data are presented as mean and standard deviation (expressed as± SD). p values ≤ 0.05 were set as statistically significant. R= right side; L= left side.

MEDA mean values (table 3) was assessed as 7.19 ± 2.7, with medium adherence to the principles of the Mediterranean diet. Analysing the various items, variability between women and man was observed (figure 1). The difference in the consumption of white meat for the female population, dried fruit for the male. Increased use of saturated fat in the female population (who most often takes care of meals). About EQ-5D values (table 3), the mean percentage of perceived health level was 71.14 ±17.83. In all dimensions of health investigated we observed no differences between women and men. About PAL questionnaires values (table 3), we measured a total weekly energy expenditure of 36.55±38.50 MET-h/ week. Moreover, we observed a total sedentary time of 231.64±205.88 min, with differences ($p<0.001$) between man (528.0±321.43) and women (172.37±109.72) groups. Finally, PACES questionnaires revealed a total score of 61.06±14.79 (table 3), with no differences between women and men.

Physical Performance Measures (table 4). Physical performance tests showed *2 Minutes Step Test* average = 86.75±16.67 and *Chair Sit and Reach test* average = 1.79±3.13 for the right side and 2.21±4.03 for the left side, with some differences between women and men group regarding strength and flexibility ($p<0.05$).

DISCUSSION

The observational study conducted on 36 elderly subjects from the Deruta's UNITRE Institute shows a good general state of health with discrete motor skills, a lifestyle moderately active and a medium adherence to the Mediterranean Diet.

Starting from information of a general nature, it is possible to highlight a big number (about 50%) of subjects with hypertension, main risk factor for atherosclerosis. Some of the subjects had diabetes too. It is known that the mentioned pathologies are strongly dependent on the lifestyle habits, including exercise [19-21]. An high percentage of cases with osteoporosis have been also revealed from the study, mainly on female subjects (9 cases) according to the known literature which states that the lack of estrogen's protective function (in postmenopausal women) increases the risk of developing [22]. The whole sample didn't show any memory disturbance, except for a Parkinson case. The prevalence of cancer was instead quite high (8 cases out of 36); woman were mainly affected (5 cases of breast cancer).

Some authors highlighted how physical activity can play an important role in the perception of the quality of life in the elderly [23] and it [24] contributes to a successful aging, which consists of containing pain, maintaining usual activities and autonomy in personal care. In our sample, the assessment of physical activity levels reveals that the sample adheres to the world guidelines for older adults (65 years old and higher) making at least 150 minutes/per week of moderate physical activity or at least 75 minutes/per week of vigorous physical aerobic activity [25]. The average energy consumption of the sample is 2193.14 MET- min/week which corresponds, based on the standards, to a moderate physical activity level. Moreover, according to Marten et al. [26] we used the questionnaire EQ-5D-3L, to study some domains of the health-related quality of life. It is possible to claim, from the resulting average, that the tested population presents a good health state (71.14±17.83 on 100 points, value that indicates the best possible state of health) and the majority carries out daily life activities autonomously, with good motion capability, although experiencing a light form of pain and disease, especially in female subjects.

The results related to the functional assessment tests (through some test of Senior Fitness Test battery) of 12 subjects, show good results especially in resistance, which fall perfectly within the reference range [27]. According to other authors [28], another relevant fact concerns the flexibility of the lower limbs: the female succeed in carrying out the test with excellent results compared to men. The data related to strength and balance are considered optimal for women, while for men they are slightly below the limit of a successful outcome.

Some authors reported that enjoyment is consistently reported by older adults as a motive for exercise participation and it's an important factor for the maintenance of an active lifestyle [29]. Based on the Physical Activity Enjoyment Scale (PACES), the sample shows a score quite high (61.06 out of 80).

The average score of the questionnaire "14-items Mediterranean diet assessment tool" is 7,19 ± 2,7 (DS), which indicates a medium adherence to the Mediterranean Diet principles. The assessment reveals that almost the whole totality of the sample (91,7%) makes use of olive oil as main source of lipids and a good amount of tested subjects makes use of 3 portions per day of fresh fruit and 2 portions per day of vegetables. According to the estimates of WHO, a poor consumption of fruits and vegetables is responsible for one third of coronary events and for 10% of cerebral ictus. It is recommended an assumption of 400 grams per day to prevent cardiovascular diseases, diabetes and diseases of the digestive system. Fruit and vegetable intake is also important for fibre intake. Adults should consume at least 12.6-16.7 g / 1000 kcal per day of food fibre from whole cereals, legumes, fruits and vegetables [30,31]. The percentage of subjects which consumes 3 portions of fish per week is very low (41,7%). According to the results ISMEA seems to live in cities far from the sea (such as Deruta, Umbria) is related to a lower consumption of fish [32]. It is known that fish consumption is fundamental for the intake of high quality proteins, omega 3 and minerals [31]. The weekly intake of legumes and dried fruit could also be increased compared to the sample results (respectively 58,3 % and 41,7 %) because they are an excellent protein sources of vegetable origin and fibre [31]. On the other hand, the fats consumption of animal origin (butter, creams, cheeses) should be reduced since only 44% of the sample consumes less than one portion per day. These are rich in saturated fat acids which could bring to a significant increase of the total cholesterol and LDL and the risk of cardiovascular disease [33]. About half of the sample has no preference between red and white meat, and 36% of the subjects makes use of more than one portion of red or processed meat per day (especially among men. According to the principles of the Mediterranean Diet, it is necessary to limit the consumption of meat (2-3 times a week), preferring the white one (due to the lower content of fatty acids) [31]. According to World Cancer Research Fund [34], it is recommended to limit consumption to no more than 3 servings per week (about 350g-500g) of cooked red meat, to provide a balance between the advantages of eating red meat (as a source of essential macro- and micronutrients) and the disadvantages (an increased risk of colorectal cancer and other non-communicable diseases). Furthermore it is recommended to consume very little, if any, processed meat [34]. Another relevant data is that only the 25% of the subjects consumes less than 2 portions a week of commercial sweets when instead according to the food pyramid , they should be limited to a monthly consumption. These are rich of free sugars (high glycaemic index) which are related to weight gain and to the increase of daily energy intake and risk of non-communicable diseases (as well as primary cause of dental caries). According to WHO guidelines, simple sugars should not exceed 10% of the total daily carbohydrate rate [35].

With advancing age, the self-perception changes since in addition to the change in body composition, there is a physiological reduction in height due to the compression of the spinal column and the reduction in bone density [22]. In the sample, in fact, interesting differences emerge between the real measurements (taken by the operator) and those reported by the subject (in the man group the measured height average was 169 cm, while the referred height average was 173 cm; in the women group the measured height average was 152 cm, while the referred height average was 159 cm).

The BMI, calculated with real weight and height, was found to be 27.65 for men and 28 for women: a situation of overweight in both sexes but for older populations, being overweight was not found to be associated with an increased risk of mortality [36].

According to Woo et al. [37], we used the waist circumference to assess the cardiovascular risk: we observed values above the risk limit for the onset of metabolic and cardiovascular diseases, with an average of 92.35 cm for women and 108.67 cm for men: the most recent studies about metabolic diseases, obesity and death demonstrate that these are critical values since the accumulation of fat at a visceral (central) level, is more dangerous than the one distributed evenly throughout the body [38].

From the impedance analysis we obtained the body composition data which, in general, showed a high percentage of FM (30.7% in women and 25% in man) correlated with the reduction of TBW (47% in women and 53 % in man) and the physiological increase in adipose tissue with advancing age [39]. Lower percentages of TBW are due to conditions of dehydration, loss of lean mass or increase in fat mass, or to the presence of chronic inflammatory processes that involve a change in body water distribution [40]. In the female sample the BM is 2 Kg and the FFM is 43 Kg (68% of the

body weight) a value that is below the norm. In the male sample the BM is 3 Kg and the FFM is 62 Kg (77% of the body weight), a slightly elevated value.
The sample shows a BMR of 1793 Kcal (men) and 1271 Kcal (women); the difference is due to an higher percentage of lean mass (metabolically active) in men and a physiological dominance of fat mass in women. It is a slightly elevated BMR compared to the one listed in the LARNs, calculated for a normal weight population.

This study has some limitations. First, few outcomes were based on self-reported recall measures. Moreover, the tests chosen to assess physical performance are debatable. Because it were administrated during the education classes meeting of UNITRE, the tests were chosen among those that were easy to perform in a school environments, and only few of the several physical fitness tests suitable for the selected age group [25] were considered.

Finally, the age range (62-91 years) of the study population could condition the generalizability of our results. It is important to specify that the results presented in this paper are the first generated from the pilot project, which could be implemented with subsequent follow-up evaluations.

CONCLUSIONS

In this report are presented the data collected in the first epidemiological study observing the "Lifestyles of the elderly Umbrian population" carried out in the UNITRE headquarters in Deruta. The population examined leads a healthy lifestyle, with an average adherence to the Mediterranean diet and moderate physical activity habits that allow them to lead a moderately active life. However, an overweight situation emerged from the analysis of the nutritional status despite the positive results of the IPAq. In a future vision, to give continuity to the project, a path of food education could be undertaken in the various UNITRE locations based on the principles of healthy eating in order to bring the population back into the normal weight range, thus reducing the risk of chronic non-communicable diseases.

This pilot phase of "LIFEUP" gave us an overview of a small group of the elderly in Umbria population thanks to a multidisciplinary team work (Doctor, Nutrition Biologist and graduate in Sports Science) aimed at studying lifestyle habits. We propose to expand the sample by extending the project to other UNITRE national offices, involving other professional figures (i.e. psychologist) to implement prevention and health promotion plans among the elderly.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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