Hippuric acid as a marker of frailty: the mediation role of fruit and vegetable intake

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Background and objectives

Frailty is a geriatric syndrome characterized by a decrease in physiological reserves, leading to higher vulnerability to stressors. Although frailty is closely related to aging, its degree differs among people of the same age. As a result, identifying people at risk when this condition is still sub-clinical and interventions are most likely to be effective is an urgent need for aging care [1] The aim of the present study is to identify plasma markers of frailty in an older adults Italian population (Invece,Ab, NCT01345110).

Methods

Plasma from 130 individuals (older adults aged 76-78 years) ranked into Fit and Frail by the Frailty Index (FI) [2], was analyzed, and validated (on 303 participants) using mass spectrometry-based metabolomics approaches.

Results

We identified in hippuric acid (HA), the glycine conjugate of benzoic acid derived from microbial degradation of polyphenolic dietary compounds [3], the metabolite able to discriminate between Fit and Frail elderly. The HA concentration significantly drops in Frails relative to Fits. Mediation analysis using FI, HA and fruit-vegetable intake indicates fruit-vegetable intake as the mediator of the HA-FI relationship. To test the predictive power of plasma HA in the risk of frailty, we examined subjects who were Non-frail (Fits and PreFrails) in 2014 and re-evaluated for frailty in 2018 (n=174). Logistic regression analysis showed that high HA levels significantly reduced the risk of frailty after four years.

Conclusion

These data point to that low plasma HA as a plausible hallmark of frailty status, associated with reduced fruit-vegetable intakes.

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TITLE   Spirulina: The New Nutritional Approach for sustainable nutrition, towards Carbon Neutrality

Roberta Carotenuto

Background and objectives

This new nutritional approach was created to combine the agro-food tradition with the future of nutrition and NUTRACEUTICS: eating not only to eat, but to feel good.

Spirulina (Arthrospira platensis) is a blue-green microalgae, with a spiral shape, used in food since ancient times for its exceptional nutritional potential.

Defined by the UN World Food Conference as "food of the future" for its properties and high sustainability of cultivation, as is now known, Spirulina is one of the most complete and balanced foods that nature offers us, a true superfood which contains all the nutrients the body needs: proteins, mineral salts, essential fatty acids, vitamins and antioxidants.

Tank cultivation (in a protected environment) and processing of Spirulina microalgae are characterized by the recovery of all resources and the principles of the circular economy; all this means that production is 100% sustainable:

- does not cause pollution and contributes to the abatement of greenhouse gases, capturing CO2 (for each Kg of Spirulina produced, 2 kg of CO2 is fixed from the environment);
- does not cause soil erosion, water contamination or forest destruction, does not require the use of toxic pesticides and herbicides;
- 1/50 of the water is used to obtain the same proteins as beef.

The Spirulina microalga is able to increase and integrate the nutritional content of conventional foods, generating beneficial effects on health.

METHODS

100 subjects with a BMI between 25 and 43 were recruited. The selected subjects were subjected to a hypocaloric diet. Some subjects had only a need for weight loss, while others in association with the need to lose weight had different physiopathological situations (anemia, reduced tolerance to carbohydrates, dyslipidemia, hypertension, intestinal dysbiosis).

Personalized food plans, developed for each patient, involve the use of 100% pure dehydrated spirulina consumed as it is (in the form of a stick added to yogurt or various beverages) or added to flours and various types of ingredients, to make pasta, bread, baked and various products, in order to increase the nutritional value of the finished product and make it a functional food.

The patients followed the dietary plan for a maximum of 2 continuous months, in some cases they continued beyond the two months with periods of rest of about 15 days.

RESULTS

The controlled intake of Spirulina in the context of a balanced diet determines in patients a physiological sense of satiety, also supported by the energizing action of the microalga, which increases compliance with diet therapy.

The balanced low-calorie food plan, in micro and macro nutrients, allowed to obtain a significant weight loss and a normalization of altered blood chemistry parameters (LDL cholesterol, triglycerides, GOT, GPT, blood glucose).Another interesting result was the improvement of blood chemistry parameters such as serum iron, ferritin and hemoglobin in patients with iron deficiency or in vegan and vegetarian patients. In most plants, the bioavailability of iron is reduced due to the presence of phytates and oxalates which make the iron not fully assimilable in the intestine.

In Spirulina the absence of phytates and oxalates increases the bioavailability of iron, allowing an improvement in the blood chemistry parameters listed above.

CONCLUSIONS

The multiple nutritional and reconstituting properties of Spirulina make it the natural product for all those who want to maintain a healthy and balanced lifestyle, which through healthy eating will prevent the occurrence of serious diseases, or to supplement the diet of people with deficiencies At the same time, it is important to promote cultural and environmental awareness and the training of conscious consumers in choosing a healthy diet and their own ecological footprint. Spirulina is a food characterized by extraordinary benefits both for human nutrition and for environmental sustainability.

TITOLO
Spirulina: il nuovo approccio nutrizionale per nutrire in modo sostenibile, verso la Carbon Neutrality
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INTRODUZIONE

Questo nuovo approccio nutrizionale nasce per   coniugare la tradizione agro-alimentare al futuro dell'alimentazione e alla Nutraceutica: mangiare non solo per nutrirsi, ma per stare bene.
La Spirulina (Arthrospira platensis) è una microalga di colore verde-azzurro, dalla forma a spirale, utilizzata in ambito alimentare fin dall'antichità per il suo eccezionale potenziale nutritivo.
Definita dalla Conferenza mondiale dell'alimentazione dell'Onu come "alimento del futuro" per le sue proprietà e l'alta sostenibilità di coltivazione, come ormai noto la Spirulina è uno degli alimenti più completi e bilanciati che la natura ci offre, un vero superfood che contiene tutti gli elementi nutritivi di cui necessita l'organismo: proteine, sali minerali, acidi grassi essenziali, vitamine e antiossidanti. La coltivazione in vasca e di trasformazione della microalga Spirulina sono caratterizzate dal recupero di tutte le risorse e dai principi dell'economia circolare; tutto ciò fa sì che la produzione sia sostenibile al 100%:
-    non causa inquinamento e contribuisce all'abbattimento dei gas serra, catturando Co2
-    non causa erosione del terreno, contaminazione di acqua o distruzione forestale, non richiede l'utilizzo di pesticidi tossici ed erbicidi;
-    viene utilizzata 1/50 dell'acqua per ottenere le stesse proteine del manzo.
La microalga Spirulina è in grado di aumentare e integrare il contenuto nutrizionale degli alimenti convenzionali generando effetti benefici sulla salute.

 METODI

Sono stati reclutati 200 soggetti con un BMI compreso tra 25 e 43. I soggetti selezionati sono stati sottoposti ad un regime alimentare ipocalorico. Alcuni soggetti presentavano solo necessità di calo ponderale altri invece presentavano situazioni fisio-patologiche diverse (anemia , ridotta tolleranza ai carboidrati, dislipidemie, ipertensione, disbiosi intestinale). I piani alimentari, prevedono l'utilizzo della Spirulina disidratata pura al 100% consumata tal o aggiunta a farine e ingredienti di vario tipo, per farne pasta, pane, prodotti da forno e varie, al fine di incrementare il valore nutrizionale del prodotto finito e renderlo un alimento funzionale. I pazienti hanno seguito il piano dietoterapico per un massimo di 2 mesi continuativi, in alcuni casi hanno proseguito oltre i due mesi con periodi di sosta di circa 15 giorni.

RISULTATI

L'assunzione controllata di Spirulina nell'ambito di una dieta equilibrata determina nei pazienti un fisiologico senso di sazietà, supportato anche dall'azione energizzante della microalga, che aumenta la compliance alla terapia dietetica. Il piano alimentare   bilanciato , in micro e macro nutrienti, ha permesso di ottenere una perdita di peso significativa ed una normalizzazione di parametri ematochimici alterati (colesterolo LDL, trigliceridi, GOT, GPT, glicemia). Altro risultato interessante è stato il miglioramento dei parametri ematochimici quali sideremia , ferritina ed emoglobina in pazienti che manifestavano carenza di ferro o in pz vegani e vegetariani.

CONCLUSIONI

Le molteplici proprietà nutritive e ricostituenti della Spirulina la rendono il prodotto naturale per tutti coloro che vogliano mantenere uno stile di vita sano ed equilibrato, che attraverso una sana alimentazione vogliano prevenire insorgenze di patologie anche gravi, o per integrare la dieta delle persone affette da carenze alimentari (vegani, vegetariani, celiaci, intolleranti) e per la perdita del peso. Parallelamente è importante promuovere la sensibilizzazione culturale e ambientale e la formazione di consumatori consapevoli nella scelta di una sana alimentazione e della propria impronta ecologica. La Spirulina è un cibo caratterizzato da straordinari benefici sia per la nutrizione umana che per la sostenibilità ambientale :
per nutrirsi in modo sostenibile .

Eating behaviour analysis of patients with severe obesity undergoing bariatric surgery

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ABSTRACT

Background and objectives

This work evaluates eating behaviour and body perception across two groups of patients characterized by degree II obesity (BMI $\geq$ 35).

The first group (GB) undergoing Sleeve Gastrectomy, supervised by the multidisciplinary team pre and post-surgery, the second one (GD) supervised by the multidisciplinary team during a diet therapy with five days admission to a specialist clinic.

Methods

Patients are from the GAPP center in Alessandria, where they were administered the BES (Binge Eating Scale) and BUT (Body Uneasiness Test) questionnaires, and they were required a 7 days food and physical activity diary. We assess the treatment's differences implementing a one-way ANOVA statistical analysis.

Results

Overall, we find that in terms of weight loss, therapy is more successful in bariatric surgery's patients. GBs have insufficient protein, vitamin and mineral salt consumption that require integration. GDs also show low protein consumption, whereas the micronutrients are correctly introduced. Both exhibit low legumes and fruits' consumption, and an excess intake of red meat, cheese and cold cuts.

Body imagine despair is clinically significant in both groups, but the GB group is more afraid of weight gain. Lower scores in BUT and BES, and an increase in physical activity are correlated with greater weight loss.

Conclusions

The study highlights the need to make nutrition and physical activity become a lifestyle, especially in bariatric patients, since surgery cannot be the solution without a constant behavioral and dietary change. Patients' despair must also be monitored since body discomfort does not noticeably improve only with weight loss.

Alarming Weight Cutting Practices in Youth Olympic Combat Sports

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Abstract

Background and objectives: Patterns of weight cycling in adult combat sports have been extensively studied, yet data on this matter in child and adolescent combat athletes is rather scarce.

Methods: PubMed, EBSCOhost and Web of Science were used to systematically search relevant literature. Eligible studies had to record the methods used to elicit rapid weight loss (RWL) and/or record the oscillations in bodyweight during the RWL phase within a context of an official competition in children and/or adolescent combat sport athletes.

Results: RWL is highly prevalent in children and adolescent combat athletes, ranging from 25% to 94% depending on the type of combat sport, age and level of competition. These athletes

regularly prompt RWL by increasing exercise frequency and intensity, decreasing fluid and food intake, training in impermeable suits and using sauna frequently. Overall, the magnitude of RWL was ranging from ~1% to 6.3±3.7% with significant RWL variations within individual studies and individuals within those studies.

Conclusions: Acquired data indicated that RWL patterns in young combat athletes are similar to those found in their adult counterparts. Knowing that childhood and adolescence are critical periods for growth and development, RWL needs to be stringently regulated and ideally banned in this population.

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Health-Related Lifestyle Profiles and sociodemographic correlates in an Italian Academic community.

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Background and objectives: Promoting healthy behaviors throughout life is an essential prevention tool against chronic disease onset and progression in adulthood. This study aims to explore the lifestyles of an Italian academic community to plan targeted initiatives to promote and improve healthy lifestyles in students and employees with consequent impact on their entourage.

Methods: A sample of 8715 adults (mean age = 26 years; range = 18-76; 30% male) participated in an online survey designed to evaluate the associations among lifestyle profiles (including diet, physical activity, cigarette smoking, and alcohol consumption), sociodemographic factors (age, gender, and academic role), and Body Mass Index (BMI). Lifestyle profiles were identified through cluster analysis, and a multinomial logistic regression was then performed to relate clusters obtained to sociodemographic variables and BMI.

Results: Data show that older age was associated with the probability of belonging to the clusters with the worst behavior in smoking and alcohol consumption, but with the healthiest diet. The younger the age, the greater the probability of belonging to the more physically active cluster. Men were more likely than women to belong to the lifestyle profile with the highest alcohol consumption and the highest physical activity. Lower BMI was associated with the highest amount of physical activity profile.

Conclusion: This study shed light on factors associated with different co-occurring health-related behaviors that should be considered in planning effective communication strategies promoting adherence to health claims.

Title
Effectiveness of a specific probiotic composition to reduce baby-blues and improve breastfeeding quality in post-partum women

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Background and objectives

After delivery, mothers could suffer from a common non-pathologic condition leading them to feel anxious, sad and irritable. This *post-partum* state is generally considered as part of mood disorders, called "baby blues". In this RDBP trial, the primary objective is to re-establish gut microbiota, that influences the gut-brain communication with a positive effect on mood imbalances. As a secondary endpoint, evaluation of breastfeeding quality and prevalence of infant colic have been observed.

Methods
A RDBP trial has been carried out in 200 *post-partum* healthy females divided in active (probiotics and multivitamin) and reference treatment (multivitamin) for 90 consecutive days. During the clinical visits, planned after 45 and 90 days, the gynecologist evaluates the symptoms related to maternal depression and the quality of breastfeeding, through specific questionnaires.

Results
The results showed that the active treatment, containing *Limosilactobacillus reuteri* PBS072 and *Bifidobacterium breve* BB077 ($4x10^9$ CFU/day) together with multivitamins, improved significantly the mother state compared to the reference treatment ($p<0.001$). In the same way, breast-feeding quality and baby's cries reduction reported a significant improvement in the probiotic group ($p<0.001$). These positive results are confirmed after 45 and 90 days after delivery.

Conclusions
The importance of maintaining a healthy gut microbiota in the regulation of gut-brain axis is crucial. In such a delicate condition like post-pregnancy, mum's mood can be affected by several changes, also linked to an altered gut microbiota. The present clinical study showed the positive effect of a probiotic supplement in improving mum's mood symptoms in the first trimester after delivery.

Sarcopenia and Long-COVID:
nutritional strategies for home rehabilitation

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Background and objectives
Long-COVID can become a risk factor for the development of sarcopenia and/or malnutrition, but it can also arise in already malnourished and/or sarcopenic patients.
The aim of this work was to develop practical sheets for post-Covid elderly sarcopenic and/or malnourished in-or outpatients in order to provide nutritional strategies for self-management.

Methods
We created easy-to-use cards with nutritional tips for patients with dysgeusia, parosmia, loss of appetite, nausea, diarrhea, abdominal distension, fatigue, neurological symptoms, wheezing and dry mouth. Low volume, few ingredients, easy to cook recipes were created considering national and international nutritional guidelines.

Results
We propose 4 nutritional tips cards for healthy diet and nutritional education using simple language and graphics, useful for inpatients nutritional rehabilitation process and also as a tool to enable long-term self-management in elderly outpatients.
In addition, we developed:
- 1 card for 24h food-intake
- 1 card for Oral Nutritional Supplements (ONS) intake
- 1 card with 2 recipes using ONS to prepare snacks
- 8 cards with nutritional advise for specific Long-Covid symptoms
- 28 recipes cards (for breakfast, lunch, dinner and snacks)
- 3 daily menus (1500 kcal, 1800 kcal, 2100 kcal)

Conclusions
This preliminary work emphasizes the importance of easy-to-use tools to deliver a fast but personalized nutritional intervention in elderly post-covid sarcopenic patients. The cards developed could become part of the nutritional tele-consultation record and be used for long-term nutritional rehabilitation.

Can the Neck circumference replace BMI as a reliable risk index among COVID-19 patients?

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Background and objectives
SARS-COV-2 infection can have a severe clinical course, burdened by death, especially in patients with obesity, cardiometabolic and respiratory comorbidities. Body Mass Index (BMI) is a risk indicator that has some limitations such as disregarding lean mass and fat distribution. On the contrary, Neck Circumference (NC) correlates with waist circumferences and with cardio-metabolic-inflammatory risk factors; for this reason, NC has a more reliable physiopathological value compared to BMI[1,2,3].
The objective of our study was to validate the potential of NC as a predictor of critical condition in COVID-19 patients.
Methods
We have conducted a prospective multicenter study on 397 hospitalized COVID-19 patients (Ospedale Universitario di Trieste, Italy and Ospedale Universitario di Recife, Brazil) from March to December 2020, to whom NC was measured on admission.
The median age was 65 (54-75), 68%(n=272) were male and 25% were obese. The NC median was 38 cm (36–40) for women and 42 cm (39–44) for men.
Study outcome: mortality at 30 and 60 days from diagnosis.
Results
Cumulative mortality rate was 13.1%(n=52) and 15.9%(n=63) at 30 and 60 days, respectively. Patients with the "large neck" phenotype (> 4° quartile) showed a significative increased risk of death at 30 (p=0.017) and 60-days(p=0.019).
Conclusions
In a previous study[3], we highlighted how the neck circumference, taken on admission, was associated independently and significatively with intubation risk.In this study, we showed how hospitalized COVID-19 patients with the "large neck" phenotype have more than doubled the risk of mortality, independently from BMI.

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CANNED FISH CONSUMPTION AND COLON RECTAL CANCER RISK

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Background and objectives

In 2020 colorectal cancer (CRC) was the second leading cause of cancer mortality worldwide. Primary prevention is essential for reducing this burden, acting on modifiable factors, like dietary habits. Previous studies reported a protective effect of fish on CRC, mainly considering fresh and processed fish as a unique item, thus preventing to disentangle their possibly different effects. We aimed to investigate the relationship between canned fish consumption and CRC risk.

Methods

We analyzed data from two case-control studies conducted in different Italian areas between 1992 and 2010, including a total of 2419 cases and 4723 hospital-based controls. Canned fish consumption was analyzed on the weekly frequency as <1 serving per week (s/w), 1<2 s/w and ≥2 s/w. Odds ratios (ORs) and 95% confidence intervals (95%CIs) have been estimated using unconditional logistic regression models, adjusting for main recognized confounding factors.

Results

We found an inverse association between canned fish and CRC risk with a significant trend (OR=0.81, 95%CI: 0.71-0.92 for intermediate consumption and OR=0.66, 95%CI: 0.51-0.85 for the highest). The same results were also confirmed for colon and rectal cancer separately (OR=0.66, 95%CI: 0.49-0.90 and OR=0.65, 95%CI: 0.44-0.95 for the highest category) and also in strata of several covariates.

Conclusions

This study shows an inverse dose-response association between canned fish consumption and CRC risk. Studying canned fish as a separate food can help identify strategies to support healthy diet in the population with relevant public health implications, given the high rank of CRC in incidence and mortality.

The role of diet on the risk of dementia in the oldest old: The Monzino 80-plus population-based study

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Background & aims: Dementia is one of the most prevalent chronic age-related diseases, and lacks effective treatments. Dietary habits and nutrition may be important modifiable risk factors for dementia, but evidence is still limited particularly among the very old. Aim of the present work is to study the association of the Mediterranean diet and its components with prevalent and incident dementia in the oldest-old.

Methods: A longitudinal and a cross-sectional studies were conducted analyzing data from the Monzino 80-plus study, a population-based study in subjects 80 years or older in the Varese province in Italy. Dietary habits were assessed using an FFQ and adherence to Mediterranean Diet was evaluated calculating a Mediterranean Diet Score. Multivariable models for dementia prevalence and incidence were adjusted for demographic and clinical characteristics.

Results: Information on nutrition was available for 1390 subjects in the cross-sectional study and 512 subjects in the longitudinal study. Greater adherence to Mediterranean diet, consumption of eggs, fruits and vegetables, carbohydrates, and greater food intake were associated with a lower prevalence of dementia. Increasing number of portions per week and consumption of legumes significantly decreased by about one-third the incidence of dementia during the 3.6-year mean follow- up.

Conclusion: Oldest-old eating less and having diets with less variety and nutrient density were more frequent among subjects with dementia. The longitudinal analysis confirmed oldest-old subjects who eat more and those who have a higher intake of legumes are at decreased risk of developing dementia.

A multidisciplinary approach to study and manage the childhood obesity

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"Background and objectives",

Childhood obesity constitutes one of the major worldwide public health problems.

Okkio Surveillance System data (2019) indicate national percentage of obese and overweight children (6-10 years) is 9.4% and 20.4% respectively.

The goal of this project is to investigate genetic alterations that encode receptors or enzymes involved in vitamin metabolism such as cholesterol metabolism (Duncal L.; 2017). We will perform endocrinological analyses to highlight interaction between diet, metabolism and hormonal balance in children, as possible factors of obesity.

"Methods",

We propose a multidisciplinary team of physicians, nutritionists, geneticists and psychologists to address childhood obesity with a systemic approach.

The initial step will be identify a possible family predisposition and lifestyle issues and then proceed to genetic analysis evaluating the result in relation to the environment.

The duration of the project is 24 months. We will analyse a genetic profile of 150 children to identify predispositions, comparing them with the family medical history, psychological aspects and an endocrinological check-up.

A computational model will be used for genetic analysis evaluating the contribution of different genetic variants.

Afterwards will be carried out training for parents, school and health professionals.

"Results",

The project is in progress, slowed down by the pandemic context. Some results derive from a pilot experience of the San Paolo Hospital Milan, the impairment of the hormonal axis in the obese pubertal male children.

"Conclusions"

To address childhood obesity with a multidisciplinary approach for gender and precision medicine. Supported by appropriate nutrition education based on scientific approach.

Food addiction assessment in a nonclinical sample of the Italian population.

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OBJECTIVE: Discussion about the potential addictive role of certain types of food and their link with obesity has recently increased. Researchers have developed instruments to specifically assess food addiction (FA). The aim of this pilot study was to investigate the prevalence of food addiction in a nonclinical sample of the Italian population.

METHODS: All participants (n = 148: 46 males, 102 females) completed the Yale Food Addiction Scale 2.0 (YFAS 2.0) and provided self-reported measures and demographic information. They were divided into three age groups.

RESULTS: The prevalence of FA was 15.5% of our sample (82.6% of the subjects diagnosed with FA were female). The FA symptoms mean was 1.90 (SD = 2.87). In both sexes, participants aged 18–30 had the highest diagnosis of FA, with 52.1% of all FA subjects being females aged 18–30. According to the Body Mass Index (BMI), all the males diagnosed with FA were overweight or obese, as were most (63.2%) of the FA females.

CONCLUSIONS: Future food education policies could consider FA assessment together with that of other eating disorders, even among nonclinical subjects in order to anticipate diagnosis and improve treatment.

Caloric restriction, physical and creative activities against breast cancer: our pilot study

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Background and objectives

Lifestyle plays a relevant role on personal cancer risk. Diet, physical activity and general lifestyle modifications are implicated in primary and secondary cancer prevention and could improve some chronic diseases (as metabolic syndrome). The aim of the study was to measure the effectiveness of a caloric restriction regime joined to a daily practice of physical and creative activities on some parameters related to the metabolic syndrome and the compliance of the patients to the proposed scheme.

Methods

The pilot study was conducted at Laboratorio Energia Mentale's (LEM) location for three years (2017, 2019 and 2020). It involved three groups of volunteers who took part in a residential one-week lasting experimental period. The program was composed by the first 4 days of a detox nutrition plan based only on vegetable products derived from organic, biologic, synergic and integrated farming, without animal proteins, fats and simple sugars. Specifically during the first period two meals were offered to the participants, each of them based on a combined dish of whole grains, legumes, cooked vegetables and fermented ingredients. These 4 days were followed by a 3-days period of fasting or mimicking-fasting regime, consisting in one or two hypocaloric meals based on complex sugar, vegetables, oleaginous seeds and only in some cases vegetable protein. During the whole period, the participants were offered a daily postural physical activity program and a creative activity at free choice among murals, mosaic or free-hand drawing. Basal data of the participants were collected (T0). All the participants had a postural examination with a flexibility and strength test. A medical evaluation was carried out to collect the personal and anthropometric data. During this basal evaluation (T0), height, waist circumference, waist-to height ratio (WtHR), glycemic value and blood pressure were collected and reevaluated at the end of the 7 days-experience (T1).

Results

Glucose Level (p-value = 0.029 for Group 2 analisis and 0.004 for Group 3 analysisi)	T0 (Group 2/Group 3)	T1 (Group 2/Group 3)
65–94 mg/dl	45/66%	100/86%
95–114 mg/dl	55/34%	0/14%
115–125 mg/dl	0/0	0/0

Blood pressure (statistically non-significant)	T0 (Group 2/Group 3)	T1 (Group 2/Group 3)
Diastolic <89 mmHg	88/90%	100/90%
Diastolic >89 mmHg	12/10%	0/10%
Systolic <140 mmHg	88/90%	100/95%
Systolic >140 mmHg	12/10%	0/5%

Metabolic risk (WtHR) p-value = 0.016	T0 (Group 1/Group 2/Group 3)	T1 (Group 1/Group 2/Group 3)
<0.45	20/12/30%	65/45/47%
0.45–0.55	55/55/45%	20/33/30%
>0.55	25/33/30%	15/22/23%

Data of the three groups showed significant improvement in analyzed variables after the program.

Conclusions

This is the first prospective, pilot study evaluating the effects of an integrated short lifestyle change on measurable well-known metabolic parameters directly linked to metabolic syndrome and metabolic risk. Our study aims to define and to validate a "clinical signature" that correlates with the "biochemical signature," able to monitor the effect of life-style on metabolic risks and tumor prevention.