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Original article

STUDY ON THE QUALITY OF FOOD SUPPORT IN PERIODS WITH RESTRICTIONS OF MOVEMENT AND INFLUENCE ON BODY MASS INDEX

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Abstracts

Argument. The new reality, the one we are experiencing since the beginning of 2020, has brought significant changes in the social plane and implicitly in the complex system represented by the human body. Limitation of travel has brought in the life of most people a significant change in lifestyle, much different from daily activities, prior to imposing travel restrictions, but similar to sedentary lifestyle, a life style without regular physical activity and is characterized by a large volume of time in front of the computer with the tablet or phone, watching TV throughout the day, without regular physical exercises. A number of experiments have shown that the layer of abdominal fat is associated with a variety of diseases, the higher it is, the higher the risk of type II diabetes, hypertension and coronary heart disease. Everyone knows that increased carbohydrate intake leads to increased fat deposits. Thus two British nutritionists wrote in the British Journal of Nutrition in 1963, whether you agree with this statement or not, the facts remain - low-carbohydrate diets are helpful in lowering the fat layer.

Methods. The present study was conducted on a sample of 12 adult male subjects between the ages of 41 and 59, with values of the Body Mass Index (The Jackson-Pollock method for evaluating body fat percentage requires three skinfold measurements. measurement sites have the chest, abdomen and thigh) between 21.6% and 28.2%, average of 26.1%, values collected at the initial test. The group was divided into three working samples, two of them having a nutritional program aimed at weight control, the third group was given a placebo treatment. All three groups in the experiment followed a simple exercise program aimed at maintaining a minimum level of muscle tone.

Conclusion. At the end of the period and after the intermediate and final tests, statistically significant results were revealed between the two groups of experiment and the control group, but somewhat surprisingly, and between the two groups in which the food intake underwent qualitative changes, which encourages us to continue and expand the present research.

Keywords: sedentary lifestyle, quality of food intake.

Introduction

The purpose of this article is to provide an overview of the effects of isolation and the fight against sedentary lifestyle. Presentation of some aspects highlighted in the literature and which explore the mechanisms of action after the consumption of protein or carbohydrates in the clinical results on health in the case of these short-term diets, with higher protein and carbohydrates exclusively. Finally, new recommendations for designing the program of activities and choosing the quality of food according to lifestyle, the amount of protein and carbohydrates at the time of consumption are discussed in order to obtain improvements in weight management. Although there has been recurrent interest in low-carbohydrate diets over the years, it was not until the publication of a number of studies in 2003 that attention focused on their potential benefits for the treatment of obesity, diabetes and heart disease. In spite of their positive findings the aforementioned studies cautioned that more studies should be performed to assess the long-term safety and efficacy of low-carbohydrate, high-protein diets. In the present issue

of the Journal, Santesso (Santesso, Akl E, Bianchi, Mentel, Mustafa, Heels-Ansdell *et al.*), have performed a systematic review and meta-analysis on the health outcomes of individuals following high-versus low-protein diets. Most of the 74 studies included in their review have been published since 2003, which indicates the increased interest and potential use of high-protein diets as an aid to correct metabolic disorders. Owing to lack of information concerning the effect of diets on direct patient outcomes, more available and usually reported surrogate outcomes such as anthropometry and blood biomarkers were used for their analyses. Their results indicate that diets higher in protein have beneficial effects on BMI, waist circumference, systolic and diastolic blood pressure, high-density lipoproteins (HDL), fasting insulin and triglycerides; however, the effects were small to moderate and when analyzed for lower risk of bias the effects on some parameters such as HDL, fasting insulin and triglycerides were annulled (Acheson).

Evidence from animal and human studies shows that biological factors strongly influence body weight. With weight loss, hunger increases and

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energy expenditure decreases—physiological adaptations that defend against long term weight change.² Genetic factors are known to affect body weight, explaining some of the variance in body mass index (BMI) among people. However, genetic factors cannot explain why the average person today, compared with 40 years ago, seems to be “defending” a much higher body weight (Ebbeling, Feldman, Klein, Wong, Bielak, Steltz, Luoto, Wolfe, Ludwig).

There are 2 dimensions to proteins effects on appetitive sensations. First, there may be a protein-specific appetite originating from the hypothesized homeostatic regulation of dietary protein to meet bodily needs/requirements. Second, dietary protein has stronger nonspecific satiety properties than do dietary fat or carbohydrates, which may lead to reductions in daily energy intake (Skov, Toubro). Changing the diet can cause various disorders in the complex systems that the body uses to adapt to new conditions. Recent findings also show that diet-induced alterations in gut microbiota impair peripheral insulin sensitivity, which is associated with hippocampal neuronal derangements and associated mnemonic deficits. In some cases treatment with specific probiotics or prebiotics can prevent or reverse some of the deleterious impact of WD consumption on neuropsychological outcomes, indicating that targeting the microbiome may be a successful strategy for combating dietary- and metabolic-associated cognitive impairment (Noble, Hsu, Kanoski).

A diet based mainly on carbohydrates and which brings a high calorie intake in the daily ration can produce unwanted effects in our experiment. For this reason we aimed to control the amount of calories and to guide only the quality of food consumed in the two weeks by the participants in the experiment. Consumption of highly refined carbohydrates can increase the risk of obesity and diabetes. Glycaemic index is a relative ranking of carbohydrate in foods according to the speed at which they are digested, absorbed, metabolised, and ultimately affect blood glucose and insulin levels. As well as the physical health risks, diets with a high glycaemic index and load (eg, diets containing high amounts of refined carbohydrates and sugars) may also have a detrimental effect on psychological wellbeing; data from longitudinal research show an association between progressively higher dietary glycaemic index and the incidence of depressive symptoms. Clinical studies have also shown potential causal effects of refined carbohydrates on mood; experimental exposure to diets with a high glycaemic load in controlled settings increases depressive symptoms in healthy volunteers, with a

moderately large effect (Moghaddam, Saneei, Larijani, Esmailzadeh).

Despite the large number of randomized, acute meal, crossover-design studies published over the past 20 y, to our knowledge, there are no systematic reviews or meta-analyses to date comparing the effects of normal-protein with higher-protein meals on markers of appetite, satiety, and subsequent food intake. Thus, as a first step in summarizing the existing data, the following inclusion criteria were applied to the existing literature: 1) acute feeding trials of ≥ 120 min; 2) comparison of lower-fat ($<40\%$ of meal as fat), isocaloric normal-protein with higher-protein mixed meals with a protein differential of ≥ 10 g protein between meals; and 3) repetitive, postprandial assessments of appetitive sensations, hormonal responses, and/or subsequent food intake (Leidy, Clifton, Astrup, Thomas, Woods, S. Mattes).

The quality and quantity of food intake is particularly important in the general economy of the factors that complexly influence the body during periods of normal activity, but even more so if the conditions of distancing and isolation at home are definitely factors that act strongly on all systems, including psychologically, as shown in the figure below.

In the case of the experiment group in which the diet was focused on foods high in protein, we aimed to ensure that this did not harm the health of the participants, in accordance with the results of current research. The challenge with determining the effects of high protein diets on measures of health is the lack of agreement with what constitutes a “high” intake of protein. At least in athletic populations, the International Society of Sports Nutrition's position stand on protein states that “protein intakes of 1.4–2.0 g/kg/day for physically active individuals is not only safe, but may improve the training adaptations to exercise training (Campbell, Kreider, Ziegenfuss et. all). We would posit that basing a diet on percentages is misleading. That is, if one were to consume a hypoenergetic diet of 1000 kcal in which 35% of the calories were derived from protein, then that would amount to a paltry 87.5 grams of protein. Instead, high protein diets should always be defined as the amount of protein consumed per unit body weight. It is our contention that high protein diets should necessarily exceed 2.0 g/kg/d. Previous work from our laboratory discovered that an eight-week period of heavy resistance training coupled with high protein consumption (>3.0 g/kg/d) results in improvements in body composition (Antonio, Ellerbroek, Silver, et, all).

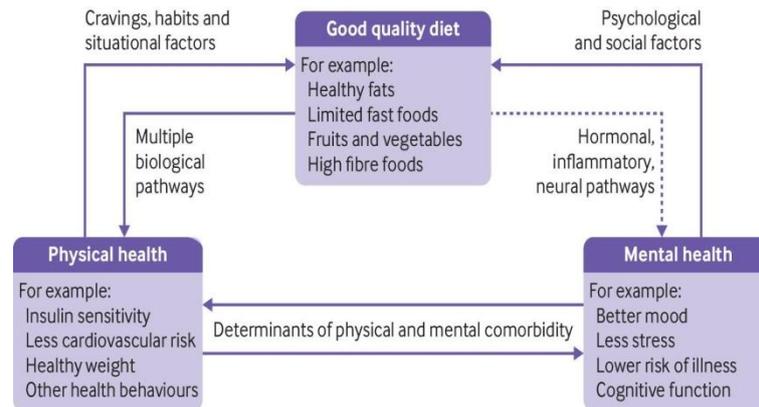


fig 1 (Firth, Gangwisch, Borisini, Wootton, Mayer) - Hypothesised relationship between diet, physical health, and mental health.

This model has been challenged, primarily owing to lack of evidence from controlled feeding studies.¹⁰¹¹¹²¹³¹⁴ A recent meta-analysis reported no meaningful difference in energy expenditure between low carbohydrate and low fat diets.¹¹ The studies included in that analysis, however, were short term (mostly <2 weeks), whereas the process of adapting to a low carbohydrate, high fat diet seems to take at least two or three weeks.⁶¹⁵¹⁶¹⁷¹⁸ For this reason, transient effects of macronutrients cannot be distinguished from long term effects on the basis of existing evidence. We compared the effects of diets varying in carbohydrate to fat ratio on energy expenditure during weight loss maintenance through 20 weeks (Ebbeling, Feldman, Klein, Wong, Bielak, Steltz, Luoto, Wolfe, Ludwig).

Methods

The group of subjects with whom the experiment was conducted consisted of 12 men. The age of the participants was between 42 and 58 years. The people selected to perform this experiment were not involved in a physical training program or weight control, did not attend gyms and had a normal lifestyle, going on average in the last 60 days prior to the experiment no more than 3000 steps daily. The measurement of the folds was performed using a caliper at the level of the three folds, on the arm, on the abdomen and on the thigh. The diet was composed in different ways for the three groups. Thus, for the first group that we will identify as - group A, the food ration did not amount to more than 2300 kcal per day for a subject, divided into 3 meals and 2 snacks. The energy value for foods consumed by group A came mainly from protein. Foods composed of carbohydrates were excluded from the food intake, especially bread in any form, pasta. The second group participating in the experiment ate food similar to group A, 3 meals and two snacks with an identical energy value, 2300 kcal. The energy value for foods consumed by group B came mainly from carbohydrates. Foods composed of protein, sugar in any form and meat and meat products, fatty cheeses were excluded from the food intake. The

training program was designed by mutual agreement with all participants, so that the volume. the intensity or complexity of the exercises should not lead to differences between the participants, but should represent a stimulus that the body should receive and can influence the rate of basal metabolism. Two training sessions were performed each day. The first was around 11-11.30, after the breakfast foods were consumed, the second exercise session was held at 17-18 before the last meal of the day. The first set of exercises consisted of two stages of kneeling. The first stage included 8 series with 15 knee bends. The first stage was followed by a 5-minute break in which the subjects made stretching movements from the seat, bending forward and sideways with the lower limbs stretched out and close or far apart, facial extensions and head rotations from the standing position. The second stage of the first training contained 8 series of knee bends with 10 repetitions in each series. We especially watched for each subject to perform the breathing movements broadly and correctly, both in the first stage and in the second when the signs of fatigue appeared. I mention that the heart rate was monitored throughout the experiment, so that the training program requires the cardiovascular and respiratory system of those who participated in our experiment. The second set of exercises was performed in the second part of the day and was composed like the morning one of two stages. In the first stage, the subjects had to do 6 series of knee bends, followed by a 5-minute break. During the break between the two stages of the evening workout, there were stretching movements from the seat, twisting of the torso with the hands at the nape of the neck, bending forward and sideways with the lower limbs stretched out and close or far apart, facial extensions and head rotations. stand position. The second and last series of the day was composed of lifting the torso from the back, 6 series with 10 repetitions, emphasis on breathing. Every day after performing the evening training program and before or sometimes after dinner, each subject walked a 2 km route, each time the same. The

attention was focused on breathing and the rhythm of the steps, trying not to make stops on the route or to have speed oscillations while moving.

The Jackson and Pollock three-value test was used to assess changes in adipose tissue. Procedure: Measurements are taken on the right side of body. Caliber needs to be perpendicular to the site analyzed. The participant must relax the muscle group that is being assessed. When skin fold is pinched, the practitioner should be taking reading at the middle of the pinched skin, not apex or base. Wait 1 to 2 seconds after releasing caliber, record closest 0.5mm. Retake each site in order to obtain accurate readings. Male measurements: Chest: diagonal fold half the distance between anterior axillary line and the nipple. Abdominal: vertical fold 2cm to the right of the navel. Thigh: midpoint of the anterior side of the upper leg between the patella and top of thigh. The Jackson-Pollock 3-spot body fat test, developed by Dr. Andrew Jackson and M. L. Pollock, researchers and scholars in human movement, is a rather simple method that can be performed quickly and easily, and without special equipment or training. All that's needed is a basic skinfold caliper, bathroom scale and the formula for the Jackson-Pollock 3-spot body fat test. One thing to note, the Jackson-Pollock 3-spot body fat test is known to be fairly accurate for most people; however, this method tends to underestimate the body fat levels of very lean individuals, including bodybuilders and performance athletes. So if you're of average build, you may want to consider giving the Jackson-Pollock 3-spot body fat test a try. The Jackson-Pollock 3-spot body fat test provides an estimate of body fat percentage and lean body mass based on age, weight, gender and the thickness of three skinfold measurements. The locations of these skinfold measurements differ, depending on whether you're a male or female. The Jackson-Pollock 3-spot formula uses chest, abdomen, and thigh skinfold test results for males; and tricep, thigh, and suprailiac skinfold test results for females to calculate body fat.

Discussion.

The concern of a growing number of researchers in the field of physical education, medicine and nutrition to identify the complex causes of the obesity epidemic facing the world's population in recent decades, in an increasing number of countries, has given rise to studies whose results have often been surprising. A small part of these studies were mentioned in the presence of the paper and come to support the final conclusion of this study, namely, moderate physical activity linked to the concern to follow how we eat can give rise to much desired changes in the lives of those who were captured by sedentarism, victims of the new travel restrictions.

Conclusion. The results of the experiment confirmed that the association of exercise with a controlled diet can lead to the loss of an amount of adipose tissue during periods of isolation at home. Obviously the training program together with the carefully oriented diet, produced a decrease in body mass index both at the intermediate test after 10 days from the beginning of the experiment, and at its end after 20 days of activity. In the case of the experiment group in which the food ration was composed mainly of protein-based foods, there was a decrease in body mass index by 2.1% at the intermediate test after 10 days and 3.1% after 20 days, the results obtained by encouraging and giving confidence to the participants in the experiment that a similar long-term or permanent activity can intervene and contribute decisively to obtaining a better physical and mental shape than if they remained in comfortable sedentary lifestyle. The diet in which foods mainly based on carbohydrates were completely absent, namely: bread, pasta, sugar, sweet carbonated drinks, had a more obvious effect than in the case of the experiment group in which the diet contained mainly foods that had energy value. produced by carbohydrates. If in the case of those who consumed more protein the decrease in body mass index was 2.5% for those who consumed protein, compared to 2.1% in the case of those who consumed mainly carbohydrates, the difference with which the index of body weight decreased in favor of those who consumed carbohydrate-free protein. In the case of those who consumed only 2,300 kcal per day without following the way they still come from and which was 1.8% in 10 days. The final tests in this experiment at 20 days, in the case of the three groups of men participating in this experiment showed a decrease of 3.6 percent body mass index in the case of those who consumed foods without protein mainly compared to a 3.1 percent decrease for the group of men who ate carbohydrate-free foods during the experiment. The lowest percentage was recorded by the group of those who consumed the same amount of calories, but from open sources without establishing any rules only the number of meals and the quantitative evaluation of the diet, not the qualitative one, however. a decrease in body mass index by 1.6% at the end of the 20 days. Surprisingly, if after 10 days the decrease in the body mass index of those who consumed mainly protein without carbohydrates was higher than that of those who consumed carbohydrates and without protein, in the end in the case of those who consumed more carbohydrates from sources Vegetable was higher than that of those who consumed protein without consuming sugar and carbohydrates from bread dough and bakery products. The final conclusion is that the food ration must be composed according to the particularities of age, constitutional type, lifestyle and eating habits, anthropometric indices,

for each client. If the fitness program can be more easily adapted from one individual to another, the food ration and the way food is consumed and prepared is at least as important to analyze and process.

References

- Acheson K, Higher-protein diets for health. *European Journal of Clinical Nutrition* volume 66, pages763–764, 2012.
- Antonio J, Ellerbroek A, Silver T, et al., A high protein diet (3.4 g/kg/d) combined with a heavy resistance training program improves body composition in healthy trained men and women—a follow-up investigation. *Journal of the International Society of Sports Nutrition*. 2015;12(1, article 39) doi: 10.1186/s12970-015-0100-0.
- Campbell B, Kreider RB, Ziegenfuss T, et al. International Society of Sports Nutrition position stand: protein and exercise. *Journal of the International Society of Sports Nutrition*. 2007;4, article 8 doi: 10.1186/1550-2783-4-8
- Ebbeling C, Feldman H, Klein C, Wong J, Bielak L, Steltz S, Luoto P Wolfe, B, Ludwig, D.- Effects of a low carbohydrate diet on energy expenditure during weight loss maintenance: randomized trial, *BMJ* 2018; 363 doi: <https://doi.org/10.1136/bmj.k4583> (Published 14 November 2018).
- Firth J, Gangwisch J, Borisini A., Wootton R, Mayer ED, Food and mood: how do diet and nutrition affect mental wellbeing? *Food for Thought* 2020. *BMJ* 2020; 369 doi: <https://doi.org/10.1136/bmj.m2382> (Published 29 June 2020)
- Leidy H, Clifton P, Astrup A, Thomas D, Woods S, Mattes R, The role of protein in weight loss and maintenance, *The American Journal of Clinical Nutrition*, Volume 101, Issue 6, June 2015, Pages 1320S–1329S.
- Moghaddam A, Saneei P, Larijani B, Esmailzadeh A. Glycemic index, glycemic load, and depression: a systematic review and meta-analysis. *Eur J Clin Nutr* 2019;73:356-65. doi:10.1038/s41430-018-0258-z pmid:30054563
- Noble E, Hsu T, Kanoski S, Gut to Brain Dysbiosis: Mechanisms Linking Western Diet Consumption, the Microbiome, and Cognitive Impairment - 2017 Jan 30;11:9. doi: 10.3389/fnbeh.2017.00009. eCollection 2017.
- Santesso N, Akl EA, Bianchi M, Mente A, Mustafa R, Heels-Ansdell D et al. Effects of higher versus lower protein diets on health outcomes: a systematic review and meta-analysis. *Eur J Clin Nutr* 2012; **66**: 1–10.
- Skov AR, Toubro, S, Randomized trial on protein vs carbohydrate in ad libitum fat reduced diet for the treatment of obesity. *Int J Obes Relat Metab Disord*. 1999.