

The 21-Day Plan: Anthropometric, Biochemical, and Cardiovascular Risk Assessment After a Lifestyle Intervention in Entre Ríos, Argentina

El Plan de 21 días: evaluación antropométrica, bioquímica y del riesgo cardiovascular luego de una intervención de estilo de vida en Entre Ríos, Argentina

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ABSTRACT

Background: The development of chronic noncommunicable diseases (NCDs) is largely associated with modifiable behavioral risk factors such as unhealthy diets, physical inactivity, smoking, excessive alcohol consumption, inadequate restorative sleep, poor stress management, and low social connectivity. Lifestyle programs that promote the systematic incorporation of healthy habits are essential to prevent and control NCDs in Latin America.

Objective: To determine the impact on anthropometric and biochemical parameters, and overall cardiovascular risk before and after a 21-Day Plan consisting of a prescribed plant-based diet and regular and personalized physical activity.

Methods: The 21-Day Plan consisted of a 21-day prescription of a plant-based diet combined with personalized physical activity, as well as psychological and spiritual support. It aimed to assess whether this intervention could modify the aforementioned parameters in the short term to confirm its benefits and potentially incorporate it as a long-term lifestyle. Data were collected from patients enrolled between March 2020 and October 2023, including body mass index (BMI) and laboratory parameters measured pre- and post-intervention.

Results: Fifty-nine patients were included in the study (mean age, 47.5 ± 12.6 years), 72.8% women. After 21 days of lifestyle intervention, BMI significantly decreased from 36.3 to 35.5 kg/m² ($p < 0.001$), total cholesterol from 191.5 to 163.6 mg/dL ($p < 0.001$), low-density lipoprotein cholesterol (LDL-C) from 130.4 to 107.6 mg/dL ($p < 0.001$), triglycerides from 145.5 to 112.5 mg/dL ($p < 0.001$), atherogenic index from 4.2 to 3.7 mg/L ($p < 0.001$), high-sensitivity C-reactive protein (hs-CRP) from 4.2 to 2.3 mg/dL ($p < 0.001$). Overall 10-year cardiovascular risk did not show statistically significant changes.

Conclusion: This lifestyle intervention was effective in significantly reducing anthropometric and biochemical parameters in the short term. A larger sample size, longer intervention duration, and longer follow-up are needed to demonstrate a significant reduction in long-term cardiovascular risk.

Key words: Cardiovascular risk – Lifestyle Medicine – Cholesterol – High-sensitivity CRP – Atherogenic index

RESUMEN

Introducción: El desarrollo de enfermedades crónicas no transmisibles (ECNT) está asociado en gran parte a factores de riesgo conductuales modificables como dietas poco saludables, inactividad física, tabaquismo, consumo excesivo de alcohol, falta de sueño reparador, bajo control del estrés y pobre conectividad social. Programas de estilo de vida que fomenten la incorporación sistemática de hábitos saludables son necesarios para ayudar en la prevención y control de las ENT en Latinoamérica.

Objetivo: Determinar el impacto a nivel antropométrico, de parámetros bioquímicos y del riesgo cardiovascular global, antes y después de un plan de 21 días consistente en la prescripción de dieta basada en plantas y actividad física regular y personalizada.

Material y métodos: El “Plan de 21 días” constó de 21 días de prescripción de dieta basada en plantas, más actividad física personalizada junto con apoyo psicológico y espiritual, y buscó comprobar si dicha prescripción lograba modificar los parámetros antes mencionados a corto plazo, con el objetivo de corroborar sus beneficios y poder incorporarlo como estilo de vida definitivo. Se recopilaron datos de pacientes inscriptos entre marzo de 2020 y octubre de 2023, relativos al índice de masa corporal (IMC) y parámetros de laboratorio medidos antes y después de la intervención.

Resultados: Se incluyeron 59 pacientes con una media de edad de $47,5 \pm 12,6$ años, 72,8 % mujeres. Luego de 21 días de intervención de estilo de vida se redujeron significativamente el IMC de 36,3 a 35,5 kg/m² ($p < 0,001$), el colesterol total de 191,5 a 163,6 mg/dL ($p < 0,001$), el colesterol LDL de 130,4 a 107,6 mg/dL ($p < 0,001$), los triglicéridos de 145,5 a 112,5 mg/dL ($p < 0,001$), el índice aterogénico de 4,2 a 3,7 ($p < 0,001$), y la proteína C reactiva (PCR) ultrasensible de 4,2 a 2,3 mg/dL ($p < 0,001$). El riesgo cardiovascular global a 10 años no experimentó cambios significativos.

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Conclusión: Esta intervención de estilo de vida fue favorable para reducir significativamente a corto plazo los parámetros antropométricos y bioquímicos estudiados. Son necesarios más pacientes, duración de la intervención y tiempo de seguimiento para demostrar una reducción significativa del riesgo cardiovascular a largo plazo.

Palabras clave: Riesgo cardiovascular - Medicina de Estilo de Vida - Colesterol - PCR ultrasensible - Índice aterogénico

INTRODUCTION

Chronic noncommunicable diseases (NCDs) are the leading cause of death and disability worldwide. In the Americas, they account for approximately 5.5 million deaths annually, about 50% of which occur in people aged 30-69 years. (1)

NCDs are associated with modifiable behavioral risk factors such as unhealthy diets, physical inactivity, smoking, excessive alcohol consumption, inadequate restorative sleep, poor stress management, and low social connectivity, which contribute to the development of obesity, fatty liver, hypertension, dyslipidemia, and insulin resistance. (2)

Lifestyle Medicine (LM) is a discipline that promotes, based on scientific evidence, the prescription of healthy habits aimed at the prevention and management of NCDs. It includes interventions that encourage healthy eating, regular physical activity, stress management, restorative sleep, avoidance of risky substances, and positive social connections. (3)

Among the most effective LM interventions are plant-based diets, characterized by the predominance of plant-based foods and the partial or total exclusion of animal products, with proven benefits in type 2 diabetes, hypertension, dyslipidemia, and obesity. (4)

Several studies have evaluated these effects: the Adventist Health Study 2 reported lower cardiovascular mortality in vegetarians and vegans in comparison with omnivores, (5) while the Atherosclerosis Risk in Communities (ARIC) study showed that higher adherence to an overall plant-based diet index is associated with lower cardiovascular risk. (6) The EPIC-Oxford study found a lower incidence of coronary artery disease in vegetarians compared to omnivores, (7) and the BROAD study demonstrated significant reductions in body mass index (BMI), lipid profile, and glycated hemoglobin in patients with obesity or cardiovascular disease. (8)

Chronic stress, defined as sustained neurohormonal activation in response to adverse situations, is a significant cardiovascular risk factor that promotes low-grade chronic inflammation, endothelial dysfunction, and progression of atherosclerosis. (9)

Regular physical activity not only improves cardiovascular and metabolic health but also promotes mental well-being, cognitive function, sleep quality, and social interaction; it encourages healthy coping mechanisms and enhanced self-perception. Physical exercise has been shown to reduce blood pressure, improve the lipid profile, increase insulin sensitivity, and decrease low-grade systemic inflammation. (10) In addition, prospective studies such as the Harvard Alum-

ni Health Study and the Aerobics Center Longitudinal Study have confirmed that sufficient physical activity is associated with a lower incidence of coronary artery disease, stroke, type 2 diabetes, and all-cause mortality. (11,12)

Insufficient or poor-quality sleep is associated with an increased risk of hypertension, obesity, insulin resistance, and cardiovascular disease. Improving sleep duration and quality has demonstrated beneficial effects on the immune system, hormonal balance, and appetite regulation. (13)

Likewise, positive social connections are protective factors against cardiovascular disease, cognitive impairment, and premature mortality. Social isolation and loneliness have been shown to exert a negative impact comparable to that of traditional risk factors such as hypertension or obesity. (14)

Furthermore, within a framework of spirituality that transcends religiosity and involves a set of moral, emotional, and behavioral values and attitudes toward the world, there is growing evidence of its benefits in terms of cardiovascular risk, mortality, and, in particular, blood pressure control. (15)

New community health programs are needed to promote the adoption of healthy habits. Therefore, the objective of this study was to determine the impact of a lifestyle intervention, referred to as the "21-Day Plan" on the anthropometric and biochemical parameters as well as cardiovascular risk in a group of patients who regularly attended a private health-care facility in Entre Ríos between March 2020 and October 2023.

METHODS

This study was conducted in the province of Entre Ríos, Argentina, over a period of 3 years and 6 months. Patients referred from different medical specialties were invited to participate. After being duly informed about the project, they voluntarily decided to enroll in the 21-Day Plan, which involved a specific cost paid by each participant. The identity and personal information of participants were kept confidential throughout the process.

Adults aged 18 years or older were invited to participate in the research by signing an informed consent form included in the admission document. All activities related to the development and implementation of the study complied with the principles of the Declaration of Helsinki. (16)

A total of 171 people registered, of whom 59 met the inclusion criteria, regardless of nationality, race, sex, religion, age, pre-existing conditions, or treatments. All participants were from Argentina and Uruguay.

Inclusion criteria required participants to have at least one modifiable and measurable risk factor (hypertension, dyslipidemia, type II diabetes, obesity), acceptable func-

tional capacity (FC I and FC II according to the New York Heart Association scale) to carry out the physical activities involved in the plan, and adequate cognitive ability to understand the tasks to be performed.

A subgroup of patients not covered by the cardiovascular risk score used in this study was excluded, based on standardized variables within the score (age between 40 and 79 years, total cholesterol between 155 and 309 mg/dL). Due to the virtual format adopted partly because of the COVID-19 pandemic and partly due to the geographical origin of some participants as well as the impossibility of collecting complete laboratory and clinical data, an additional 110 patients were excluded.

A quasi-experimental, pre- and post-, single-group, analytical and descriptive study was conducted in both face-to-face and virtual formats, involving a multidisciplinary team of professionals from Cardiology, Nutrition, Psychology, Chaplaincy, and Physical Education.

Data collection was performed between March 2020 and October 2023, following both face-to-face and virtual interviews with the Lifestyle Medicine team. (17) BMI was calculated as weight in kilograms divided by height in meters squared. Based on BMI, patients were classified into three categories: normal weight ($<25 \text{ kg/m}^2$), overweight (≥ 25 and $<30 \text{ kg/m}^2$) and obesity ($\geq 30 \text{ kg/m}^2$), which was further divided into grade 1 (≥ 30 and $< 35 \text{ kg/m}^2$), grade 2 (≥ 35 and $<40 \text{ kg/m}^2$) and grade 3 ($\geq 40 \text{ kg/m}^2$).

Fasting blood samples were collected before starting the plan and immediately after its completion, using Abbott Alinity automated analyzers. (18) The following parameters were measured: lipid profile and atherogenic index, complete blood count, blood glucose, insulin, and glycated hemoglobin, renal function (urea and creatinine), vitamin D, vitamin B12, homocysteine, and high-sensitivity C-reactive protein (hs-CRP).

The World Health Organization (WHO) cardiovascular risk chart was used to estimate the overall 10-year cardiovascular risk. (19)

The 21-Day Plan consisted of 21-day prescription of a plant-based diet combined with personalized physical activity, as well as psychological and spiritual support. It aimed to assess whether this intervention could modify the aforementioned parameters in the short term to confirm its benefits and potentially incorporate it as a long-term lifestyle. Participants received a schedule of appointments assigned by time slots and for the same day, and a roadmap designed by the Lifestyle Medicine team (see Annex 1).

The cardiologist took each patient's case history, including, personal data, personal and family history, previously diagnosed conditions, and current treatment, as well as a physical examination and identification of any symptoms that might contraindicate physical activity. The cardiologist also ordered blood tests and any other preliminary studies necessary according to each patient's risk.

Physical trainer provided a personalized and progressive exercise program, specifying frequency and intensity, according to each patient's characteristics and ability to perform the prescribed activities, and based on the cardiologist's prior assessment. Nutrition Department provided a plant-based diet plan with various food options and daily guidelines (see Annex 2), as well as a weekly virtual workshop.

The psychologist and the team chaplain provided psychological and spiritual support during the intervention, with face-to-face or virtual follow-up (via video call or WhatsApp group). In addition, virtual workshops were held via

Zoom, each addressing specific topics presented by the corresponding professional and offering space for questions and experience sharing.

Data was entered and analyzed using JASP statistical package, version 0.95.0 for Windows. For univariate analysis, frequencies, means, and standard deviations were calculated according to the type of variable. For bivariate analysis, paired t-test or Wilcoxon signed-rank sum test was performed, depending on the variable normality, with a 95% confidence level.

RESULTS

Of the 171 enrolled participants, 59 were included in the study (mean age, 47.5 ± 12.6 years); 43 were women (72.8%). Eighteen patients (30.5%) had hypertension, and 17 (28.8%) had dyslipidemia.

Ten patients (16.9%) had type 2 diabetes mellitus. Among included participants, 18.6% were overweight and 62.6% had some degree of obesity (23.7% had grade 1 obesity). Seventeen patients had hypothyroidism (28.8%). Table 1 shows baseline characteristics of the study participants

After implementation of the 21-Day Plan, a significant reduction was observed in the following parameters: body mass index from 36.3 to 35.5 kg/m^2 ($p < 0.001$), total cholesterol from 191.5 to 163.6 mg/dL ($p < 0.001$), LDL-C from 130.7 to 107.6 mg/dL ($p < 0.001$), triglycerides from 145.5 to 112.5 mg/dL ($p < 0.001$), the atherogenic index from 4.2 to 3.7 ($p < 0.001$), and hs-CRP from 4.2 to 2.3 mg/dL ($p < 0.001$). Anthropometry and laboratory measurements are shown in Table 2.

Among the 41 participants with complete measurements pre- and post-intervention, cardiovascular risk according to the WHO risk score was low in 68.3%, moderate in 4.9%, high in 19.5%, and very high in 7.3% before implementation of the 21-Day Plan. After implementation of the plan, 4 patients moved from high to moderate risk: the high-risk category decreased to 9.8%, and moderate risk increased to 14.6%; these changes were not statistically significant ($p = 0.351$). Table 3 summarizes cardiovascular risk classification.

DISCUSSION

In light of the study objectives and of previous research conducted by pioneers and organizations in the field of LM (20), based on the results obtained, we can state that a plant-based diet combined with regular physical activity positively impacts on physical health. (21)

Specific macro- and micronutrients within a predominantly plant-based dietary pattern help reduce low-density lipoprotein cholesterol (LDL-C). It has been shown that, with appropriate diet and lifestyle changes, approximately 80% of premature cardiovascular mortality may be prevented. (22)

Despite the ongoing controversy regarding the role of elevated triglycerides as an independent cardiovascular risk factor, epidemiological, clinical, and

Table 1. Baseline characteristics of the study participants (n=59)

Variable	n	%
Female sex	43	72.88
Age, years (mean \pm SD)	47.5 \pm 12.6	
Overweight	11	18.6
Grade 1 obesity	14	23.7
Grade 2 obesity	11	18.6
Grade 3 obesity	12	20.3
Type 2 diabetes mellitus	10	16.9
Smoking	1	1.7
Dyslipidemia	17	28.8
Hypertension	18	30.5
Peripheral arterial or venous disease	5	8.5
Pacemaker	3	5.08
Hypothyroidism	17	28.8
Cancer	4	6.8
Bariatric surgery	2	3.4
Depression	10	16.9
Hematologic disease	3	5.1
Neurologic disease	5	8.5
Rheumatic disease	4	6.8
Regular medication		
Beta-blockers	9	15.3
Oral antidiabetic agents	10	16.9
Antihypertensive agents	15	25.4
Lipid-lowering agents	16	27.1
Hormone replacement therapy and/or vitamins	22	37.3
Antidepressant agents	11	18.6
Benzodiazepines	6	10.2
Antiplatelet agents	2	3.4
Diuretics	4	6.8

SD: standard deviation

pathophysiological evidence indicate that, particularly in patients with insulin resistance, triglycerides are a key etiopathogenic factor in the process related to the development of atherosclerosis and cardiovascular disease. (23)

Regarding the atherogenic index, a recent clinical study published in January 2024 demonstrated that it may serve as an effective marker of future cardiovascular events in the general population, including patients with and without diabetes, and that its monitoring and management may provide additional cardiovascular benefits even in individuals without traditional risk factors. (24)

Obesity has been associated with alterations in hemodynamic, autonomic, and hormonal pathways, resulting in a spectrum of cardiovascular changes, from subclinical structural heart abnormalities to overt heart failure. (25)

A major study collected individual-level data from 1 518 028 subjects from 112 cohort studies conducted

in eight geographic regions, and assessed five cardiovascular risk factors: body mass index, systolic blood pressure, non-HDL cholesterol, current smoking, and diabetes, because of their impact on cardiovascular disease (CVD) and all-cause mortality. The five modifiable risk factors accounted for a population-attributable fraction of CVD of 57.2% in women and 52.6% in men and a population-attributable fraction of all-cause mortality of 22.2% in women and 19.1% in men, with elevated systolic blood pressure being the leading contributing factor. (26)

Among the available inflammatory biomarkers, hs-CRP is an independent and significant risk marker of ischemic cardiovascular disease, as it plays a vital role in atherogenesis. Inhibition of hs-CRP might be an innovative, effective, and safe therapy for the treatment of ischemia and myocardial and cerebral infarctions (27,28).

Finally, regarding the close relationship between psychological health, well-being, and the mind-heart-

Table 2. Anthropometric and laboratory parameters of participants pre- and post-intervention

	Pre-intervention			Post-intervention			p-value
	n	Mean	SD	n	Mean	SD	
Body mass index, kg/m ²	49	36.3	8.9	43	35.5	8.3	<0.001
Uric acid, mg/dL	33	5.5	1.9	22	5.0	1.4	0.057
hs-CRP, mg/dL	40	4.2	3.3	39	2.3	2.1	<0.001
Hematocrit, %	56	41.0	3.7	52	40.9	3.5	0.257
Hemoglobin, g/dL	56	13.3	1.5	52	13.4	1.2	0.127
Leukocytes, thousand/ μ L	56	6.6	1.5	52	6.5	1.7	0.113
Total cholesterol, mg/dL	59	191.5	43.4	58	163.6	33.6	<0.001
HDL cholesterol, mg/dL	57	46.5	9.9	58	44.5	9.3	0.020
LDL cholesterol, mg/dL	59	130.7	45.0	59	107.6	35.0	<0.001
Triglycerides, mg/dL	58	145.5	74.7	59	112.5	54.9	<0.001
Triglyceride/HDL ratio	57	3.4	2.2	57	2.6	1.5	0.029
Atherogenic index	57	4.2	1.2	57	3.7	0.9	<0.001
Blood glucose, mg/dL	56	100.5	27.9	55	96.4	15.6	0.041
Creatinine, mg/dL	52	0.78	0.20	51	0.7	0.13	0.187
Urea, mg/dL	41	29.2	11.3	46	25.2	9.6	0.016
Vitamin B12, pg/mL	43	632.5	622.8	9	365.5	252.8	0.813
Vitamin D, ng/mL	45	28.8	11.2	9	24.1	6.4	0.877
Homocysteine, μ mol/L	29	7.9	2.5	14	9.2	1.9	1.000
Glycated hemoglobin, %	27	5.7	1.15	19	5.9	1.2	0.030
Insulin, IU/mL	29	18.9	12.07	23	24.9	19.2	0.646

hs-CRP = high-sensitivity C-reactive protein

Table 3. Cardiovascular risk of participants according to WHO classification

	Pre-intervention		Post-intervention	
	n	%	n	%
Low risk	28	68.3	28	68.3
Moderate risk	2	4.9	6	14.6
High risk	8	19.5	4	9.8
Very high risk	3	7.3	3	7.3

WHO: World Health Organization

body connection, this topic warranted a specific 2021 AHA statement, which emphasized the importance of considering psychological health in the assessment and management of patients with or at risk for CVD. (29)

Based on the scientific evidence and the results obtained regarding reductions in BMI, total and LDL cholesterol, triglycerides, atherogenic index, hs-CRP, and overall cardiovascular risk, we highlight the strengths of this study and its potential for systemic and long-term application.

As main limitations, we should note that not all blood pressure and laboratory measurements were obtained both pre- and post-intervention, partly because some consultations were virtual and some patients

without medical coverage were unable to complete the laboratory tests. The intervention lasted 21 days, which may have influenced the absence of statistical significance in the variation of estimated long-term cardiovascular risk. An extended follow-up methodology has not yet been developed to verify adherence to lifestyle changes and the persistence of these outcomes.

CONCLUSIONS

The 21-Day Plan demonstrated the short-term benefit of a plant-based diet and the implementation of regular physical activity, psychological and spiritual support for stress management and emotional sup-

port on the studied anthropometric and laboratory parameters, which directly impacted on overall cardiovascular risk.

Conflicts of interest

None declared.

(See authors' conflict of interests forms on the web).

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SUPPLEMENTARY MATERIAL

Annex 1. 21-Day Plan: Roadmap – October 2023

Friday, September 28	You will be added to a WhatsApp group created for the 21-Day Plan. Additional information will be shared there, and professionals will be available to answer questions.
Monday, October 2	Face-to-face interviews at the private healthcare facility, or virtual interviews via video call. The meal plan and shopping list will be provided. The following days will be spent familiarizing yourself with the plan and obtaining the ingredients. meal plan and a shopping list. The following days are intended to get familiar with the meal plan and gather the necessary ingredients.
Monday, October 2 to Wednesday, October 4	Preparation: Purchase the ingredients for the meal plan and clarify any questions with the nutritionists. Begin implementing habits related to physical activity, hydration, sleep, and stress management
Thursdays, October 5-26	Virtual workshops via Zoom at 8 p.m. This space will provide opportunities to share experiences and ask questions. Each professional involved in the Plan will present a specific topic. <ul style="list-style-type: none"> • Thursday, October 5: “Eating with Calm” – Psychology Workshop. • Thursday, October 12: “Preparing a Healthy Plate” –Nutrition Workshop • Thursday, October 19: “In Search of Lost Muscle” – Physical Activity Workshop • Thursday, October 26: “Let’s Face It, We’re a Walking Zoo” – Cardiometabolic Workshop
WhatsApp group	Originally, the Plan was designed for individual participation, but after more than 20 editions, we have confirmed the value of making lifestyle changes together. Thus, a WhatsApp group was created to share experiences, photos of daily activities and meals, and to encourage one another throughout the program. Participation is recommended but optional. We understand that group chats can sometimes be overwhelming due to the volume of shared messages, and some participants may be more comfortable than others. Therefore, we encourage everyone to keep the group balanced by sharing content that contributes and enriches the collective experience without overloading the space. Proposed times for group interaction: <ul style="list-style-type: none"> • 8-10 a.m.: Share your experience, ask questions, encourage your peers, and receive guidance from professionals in spiritual, nutritional, and physical activity fields. • 6-9 p.m.: Share your experience, ask questions, encourage your peers and receive guidance from professionals in psychological and medical fields.
Monday, October 30	Evaluation and closing interviews with each professional. Maintenance goals will be based on what was achieved during the 21-Day Plan. These interviews will take place at the same time as the initial ones. If you have any issues attending them, please contact us: estilodevida@sanatorioadventista.org.ar Note: Body composition assessments and laboratory tests will also be repeated on this date.
Tuesday, November 5	Closure of the WhatsApp group. A link to the <i>21-Day Plan Alumni WhatsApp group</i> will be sent to those who wish to stay in touch with the professionals and other participants from previous editions.

Recommendations:

- If possible, get a juicer or blender to prepare the recipes for the first few days of the Plan.
- Find a “buddy” to accompany you in adopting the 21-Day Plan habits (family member, friend, partner, etc.). Throughout the many plan editions, we have observed that making these changes alongside someone close greatly facilitates their implementation.

ANNEX 2**Lifestyle Medicine: 21-Day Plan. Nutrition Guide***Plan Summary*

Day 1	Juices and supplements
Day 2	Juices, fruits, vegetables, whole grains, nuts, and seeds
Day 3	Same as day 2 + cooked vegetables and legume-based dressings
Day 4 Day 5	Raw and cooked vegetables, whole grains, and fruit
Day 6	Same as day 4 + legumes
Day 7 to 21	Varied menu
Day 22 onwards	New lifestyle applying what you have learned

General Recommendations

Rest schedule: never after 11 p.m. Ideally, bedtime should be between **9 p.m. and 10 p.m.**, without screen exposure.

Hydration: drink at least 2 liters of water per day, including the recommended homemade flavored waters.

Physical activity: commit to exercising at least **30-45 minutes** every day.

Foods to avoid: all types of meat and meat products, dairy products and eggs, white (refined) flour, sugar in any form, and processed foods.

Eating habits: chew food thoroughly, avoid snacking between meals, eat at regular times, and do so without distractions and in a pleasant environment

Food portions: these will be defined according to each person's caloric and nutritional requirements. Please note how the quantities are indicated, either in the table below or as specified by the professional. Follow the recommended amounts of food and preparations.