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Development of a toolkit for telenutrition in follow-up for cardiovascular disease.

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ABSTRACT

INTRODUCTION

To ensure the continuity of nutritional care in Cardiovascular Rehabilitation (CR) during the COVID-19 epidemic emergency, a toolkit for telenutritional follow-up was developed for patients at nutritional risk and patients with modifiable risk factors related to eating habits.

The reference method for this work is represented by the Nutrition Care Process and Terminology by the Academy of Nutrition and Dietetics (AND), which pursues the goal of implementing safe, effective, person-centred, timely, efficient and equitable nutritional care.

MATERIALS AND METHODS

The toolkit is composed of digital records for nutritional teleconsultation aimed at the most fragile (at risk for malnutrition), or overweight/obese, diabetic, dyslipidemic, hypertensive patients. In addition, it provides tools and educational/informative material useful to patients for carrying out the telephone consultation/video call.

CONCLUSIONS

This work - and telenutrition in general - could optimize the effectiveness of nutritional care and patient's adherence, by reducing distances, waiting times, costs and other inconveniences. Our future goal is to develop a research project involving CR centers to establish the effectiveness of using the toolkit in clinical practice, in terms of desired outcomes and follow-up dedicated time.

Keywords: telenutrition; cardiovascular rehabilitation; nutritional care; dietitian.

INTRODUZIONE

According to what is recommended by the national and international guidelines drawn up by the main scientific societies, the promotion of healthy food choices is essential as a central component of treatment projects in Cardiovascular Rehabilitation (CR) [1][2][3][4][5].

Nutritional care in CR requires the professional assessment and intervention of a dietitian, in order to:

1. early identify nutritional risk, prevent and/or treat protein-energy malnutrition;
2. encourage the modification of inappropriate eating habits, paying attention to the sustainability and the patient's resources in the implementation of the agreed nutritional treatment plan [6].

These nutritional goals can be reached within an individual rehabilitation project in CR; they are realized over time and need to be consolidated through follow-up interventions, conducted by a dietitian and usually carried out with outpatient meetings.

During the Covid-19 epidemic emergency, a strong push was given to the development of telemedicine due to the suspension/reduction of some health services, in particular those of an outpatient type, in order to guarantee the continuity of care with the minimal risk of spreading the virus. Telemedicine represents a two-way interactive communication which takes place remotely and in real time, between patient and doctor or other professional, with the use of interactive audio and video telecommunication equipment [7].

In particular, according to the Academy of Nutrition and Dietetics (AND), "Telenutrition involves the interactive use, by a RDN, of electronic information and telecommunications technologies to implement the Nutrition Care Process (nutrition assessment, nutrition diagnosis, nutrition intervention/plan of care, and nutrition monitoring and evaluation) with patients or clients at a remote location" [8].

Telenutrition allows to provide efficient nutritional consultations according to Medical Nutritional Therapy and is economically advantageous, especially for people who need regular follow-up, such as obese patients [9] or those with chronic non-communicable diseases [10][11].

Telephone nutrition counseling is an effective method for elderly patients who are malnourished or at risk for malnutrition [12].

Telenutrition programs help to reduce calorie intake and body weight in the short term by improving food quality in adult and elderly men at risk for cardiovascular diseases [13].

In 2018, a meta-analysis was published that highlighted a significant reduction of Body Mass Index (BMI) in patients with or without diabetes or hypertension, especially when the duration of the telenutrition intervention exceeded 6 months' time [14].

Home rehabilitation which combines the use of new technologies with physical activity programs and nutritional interventions, in patients with mild or moderate heart failure for at least 3 months, has been shown to be effective in supporting an improvement in the patient's physical functions. One of the actions performed by dietitians, reported in a recent study, was to estimate the nutritional intake and content of meals through the pictures sent by the patient [15].

The goal of using telemedicine is to provide outpatient nutritional care similar - or even better - to the one carried-out in person and to obtain detailed information about health and nutritional status of patients [16].

For this purpose, the Scientific Association for Food, Nutrition and Dietetics (ASAND) Cardiology Study Group has developed specific work tools for nutritional teleconsultation, aimed at patients at nutritional risk and patients with modifiable risk factors related to eating habits.

These tools are based on the Nutrition Care Process Terminology (NCPT) [17], which represents the international methodology and language for nutritional care process performed by dietitians; they provide educational and informative material, useful to patients for carrying out the telephone consultation/video call in the context of nutritional follow-up in CR (figure 1).

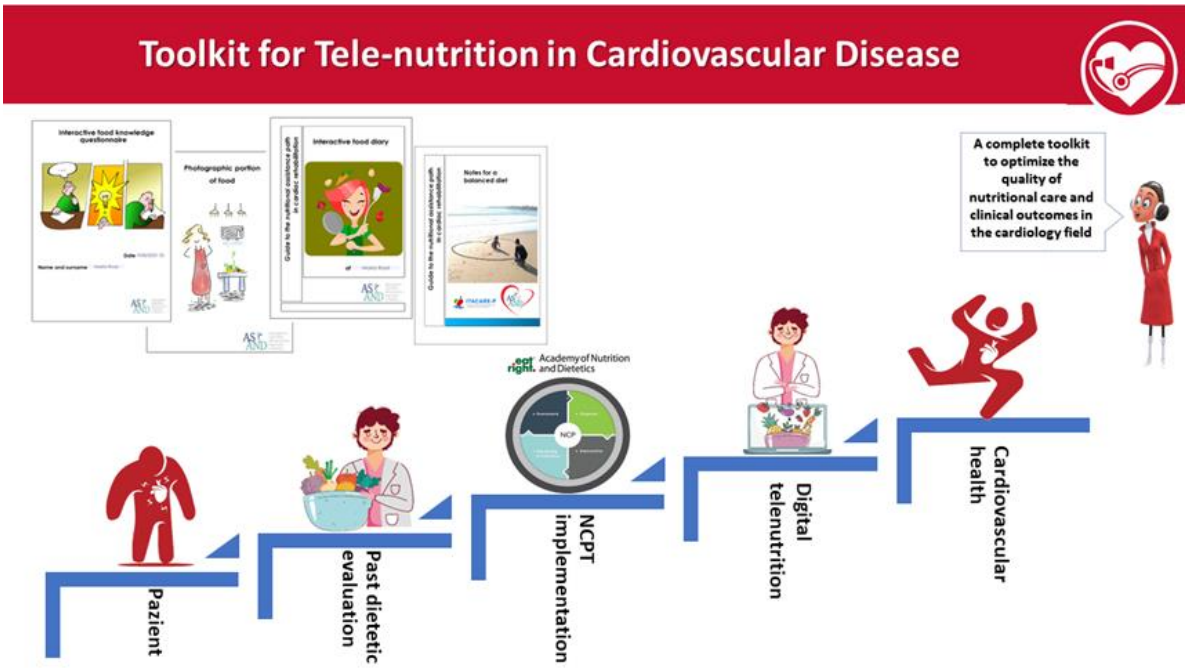

Figura 1: Nutritional Toolkit for Dietitians: specific work tools for nutritional teleconsultation, aimed at the prevention and treatment of cardiovascular diseases.

MATERIALS AND METHODS

Language and content of the dietitian's activity in Cardiovascular Rehabilitation

The Nutrition Care Process (NCP) is a systematic approach devised by dietitians to provide high quality nutritional care, that takes into account the patient/client's needs and values, using the best available evidence in making clinical decisions. The NCPT method and language pursue the goal of implementing safe, effective, person-centred, timely, efficient and equitable nutritional care [18].

The NCPT methodology accurately describes the stages of nutritional care (nutritional assessment, diagnosis, intervention, monitoring and re-evaluation) to manage the care process, achieve health goals and ensure quality of care [19].

The phase of the nutritional care process has been taken into consideration to develop the work tools useful for cardiovascular follow-up is described below.

Nutrition monitoring and outcomes evaluation

The aim is to determine the extent of the progress made by the patient, any critical issues and the achievement of the expected objectives. This is possible by establishing, during the first step of the nutrition assessment in which the problem is identified and the nutrition diagnosis formulated, precise nutritional indicators that will be measured in subsequent follow-ups, in order to evaluate the results of the nutrition intervention [20].

These indicators will refer to data such as: Food and nutrition-related history, Anthropometric measurements, Biochemical data, Medical tests and procedures, Nutrition-focused physical findings, Evaluation and Monitoring tools (such as validated tests and questionnaires, etc.) [18].

During the monitoring phase, on the basis of the collected results, it is possible to estimate the progression towards one or more nutritional goals (achieved/not achieved/ interrupted/some progress/some deviations/identification of a new goal) and/or towards the improvement or solution of the nutritional problem [18].

A new nutrition diagnosis can also be formulated (compared to the first one, made following the initial nutrition assessment). The nutrition diagnosis has the purpose of identifying and describing the nutritional problem (s) that can be solved or improved through the intervention of the dietitian. It is expressed by a PES (Problem, Etiology, Signs and Symptoms) statement, with a specific terminology organized in three categories or domains: Intake, Clinical, Behavioral-Environmental [18].

Even the nutrition intervention (third step of NCP), defined following the initial assessment and nutrition diagnosis, can be modified or confirmed on the basis of the data emerging from the monitoring act (outcomes about the planned activities, agreed with the patient in order to face, solve or improve the problem (s) identified by the diagnosis) [18].

Any nutrition intervention conducted by a dietitian may consist in planning and implementation of food and/or nutrient delivery, nutrition education, nutrition counseling, coordination of nutritional care [18].

For the implementation of NCPT in the CR field, authorization was obtained from AND and through ASAND, to translate into Italian 28 Reference Sheets, among those on the AND website https://www.ncpro.org/ and concerning the most frequently used nutrition diagnoses in CR.

Teleconsultation records for patients at risk for malnutrition and patients with modifiable risk factors related to eating habits

The following charts have been developed to complete the digital dietary records already in use in the CR field and they are meant for patients with insufficient nutritional intake and/or who do not eat orally and patients with modifiable risk factors related to eating habits (https://www.asand.it, https://www.itacarep.it/).

These are electronic records for telenutritional follow-up, created for the most fragile, or overweight/obese, diabetic, dyslipidemic, hypertensive patients.

As for the entire toolkit, they have been created in digital and interactive format using Adobe Acrobat Pro DC and can be compiled directly on a computer or tablet, equipped with a specific pdf reader program.

All form fields can be filled in, and in some cases drop-down menus are designed containing predefined options; automatic calculation of the BMI, date and time of the teleconsultation and dates of the biochemical tests are also displayed. After a first summary page about the previous nutritional check (figure n.2), the Nutrition Re-Assessment begins with the screening for nutritional risk (patient at risk for malnutrition) through the Malnutrition Screening Tool (MST) [21], the latter has been chosen as a quick and easy tool to be replicated remotely and useful for early recognition of people who may be diagnosed with malnutrition [22].

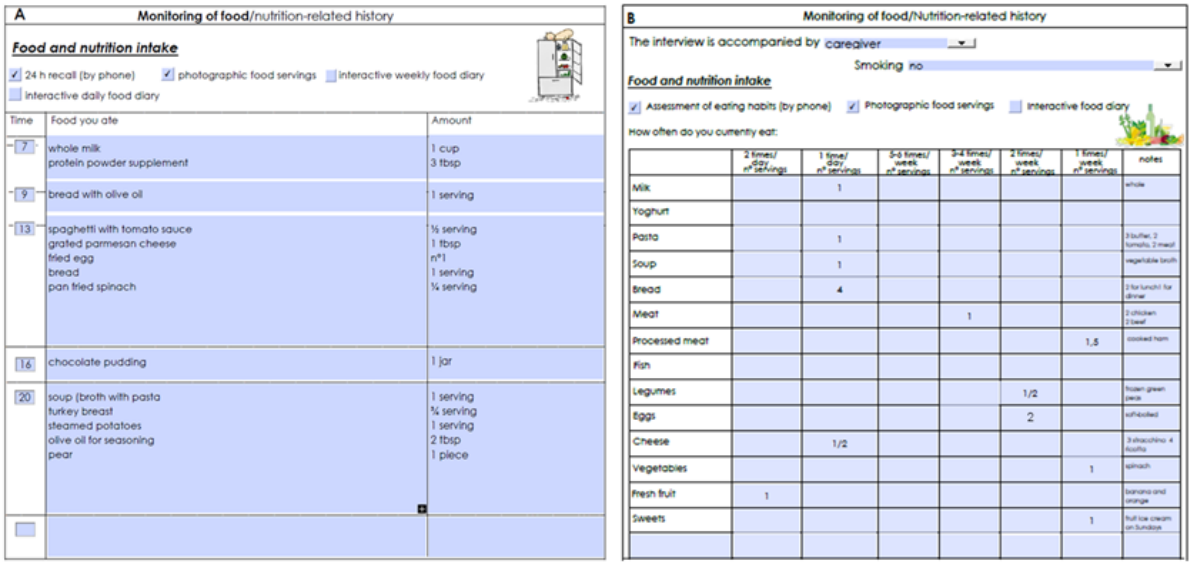

Figure 2: digital dietary records for telenutritional follow up in patients: A) with insufficient nutritional intake and/or who do not eat orally (at risk for malnutrition); B) with modifiable risk factors related to eating habits.

The re-assessment phase continues with the results regarding Food and Nutrition-related History and the monitoring of energy and nutrient intake, that can be carried out through:

- a 24-hour telephone recall (patient at risk for malnutrition, figure 3a);
- a telephone food frequency test (patient with modifiable risk factors, figure 3b);
- a weekly or daily interactive food diary (described further in this article), previously filled in by the patient and sent to the dietitian [23].

To facilitate the assessment of nutritional intakes patients are provided with an educational and informative brochure with food images, useful for estimating the consumed food portion size (see section about the teleconsultation tools) [24].

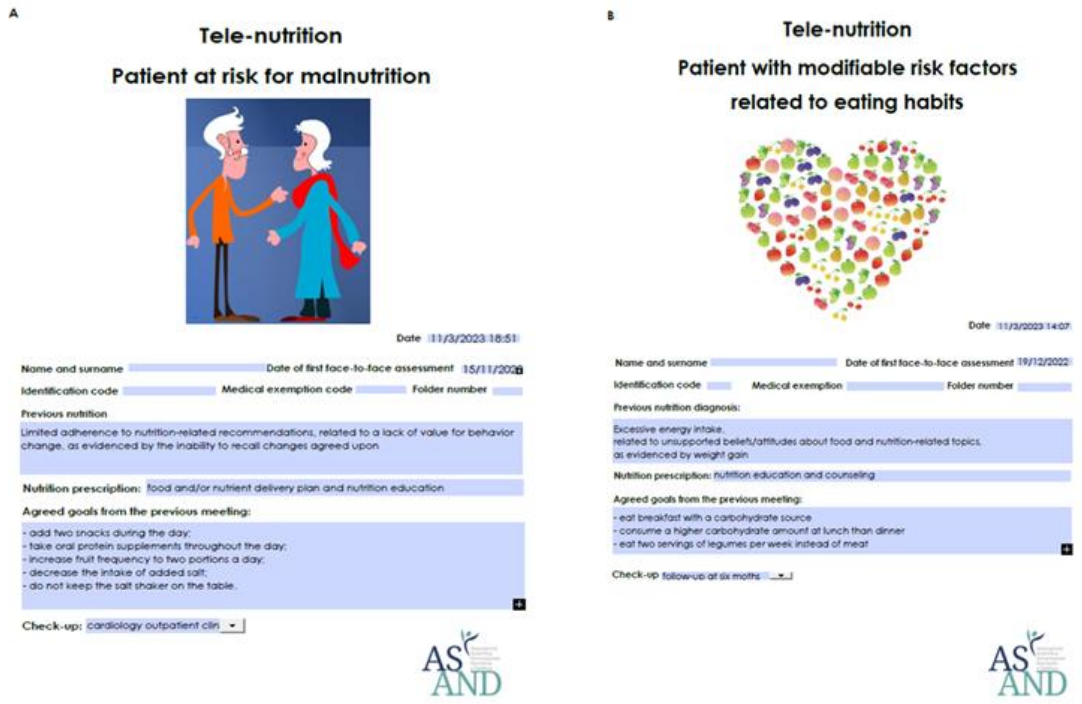

Figure 3: telemonitoring of food/nutrition-related history in patients a) at risk for malnutrition b) with modifiable risk factors related to eating habits.

Next, the assessment of knowledge/beliefs/attitudes follows (patient with modifiable risk factors), throughout the evaluation of a digital and interactive questionnaire on nutritional knowledge, compiled by the patient and sent to the dietitian (see section about the teleconsultation tools) [25][26].

To complete the monitoring of Food and Nutrition-related History, the records report specific questions regarding: frequency of consumption, management of food and nutrition, meal behavior, use of drugs or medications, factors that influence access to food, physical activity, nutrition-related quality of life; following, the re-evaluation of anthropometric measurements, biochemical data, medical tests and procedures, nutrition-focused physical findings [18][23].

As for the anthropometric measurements, they must be provided by the patient/caregiver who will be instructed on how to gauge them.

At the end of the nutrition re-assessment, we find items relating to "nutritional adherence" with a drop-down menu that shows predefined options concerning any critical issues.

It is possible to formulate a new nutrition diagnosis in PES format, which will serve to guide a new type of nutrition intervention (figure n.4). The nutrition diagnosis can be filled in via drop-down form fields too, with automatic correlation of the possible options for etiology and signs/symptoms to the type of problem identified and selected [18].

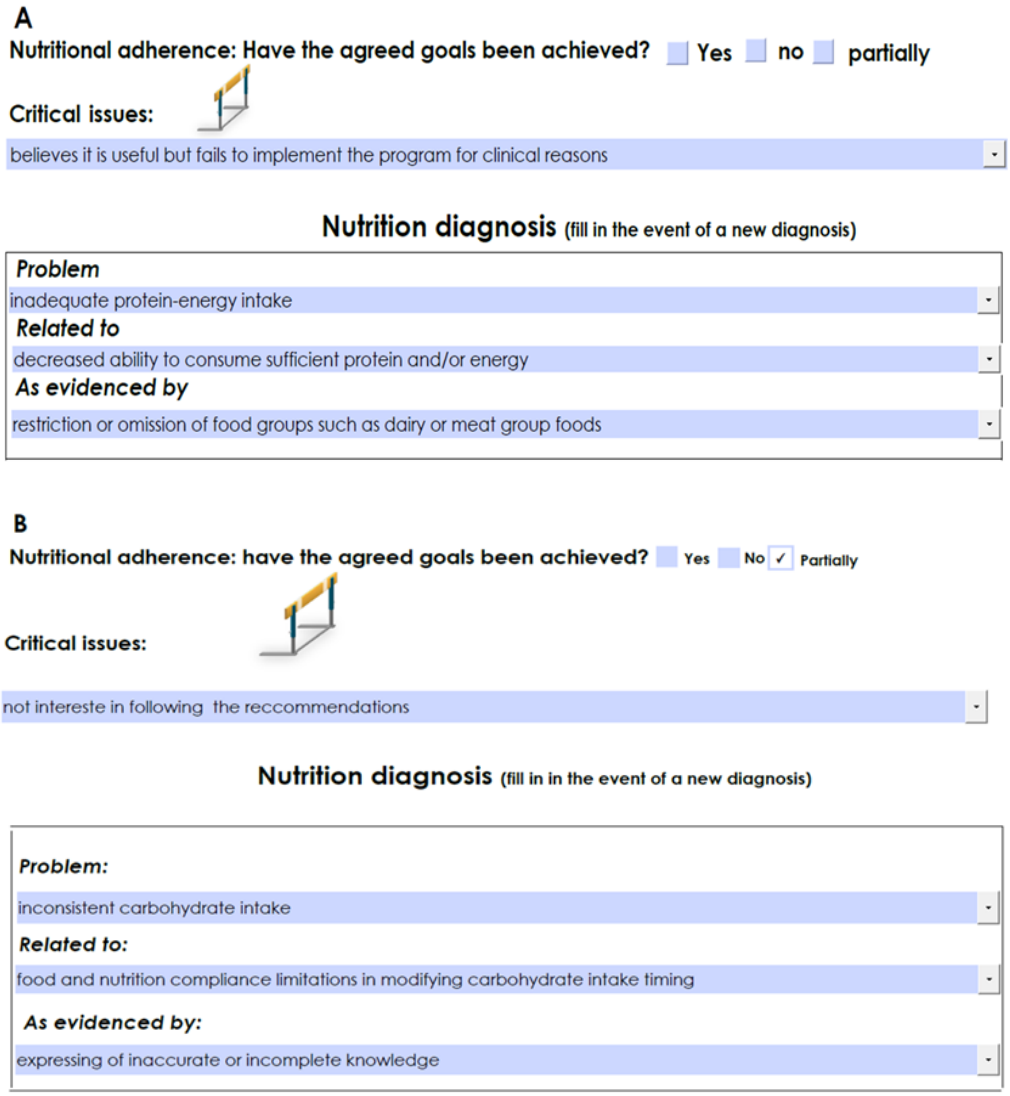

Figure 4: nutritional adherence and diagnosis. a) patient at risk for malnutrition; b) patient with modifiable risk factors related to eating habits.

The new nutrition intervention section involves the compilation of the main contents of nutrition education:

- servings, sodium intake, fat/carbohydrates quality and intake, fiber intake, alcohol (patient with modifiable risk factors) [27][28][29][30];
- meal fortification, texture change (patient at nutritional risk) [31] [32] and contents of

nutrition counseling (patient with modifiable risk factors).

In the end, the records report another drop-down menu relating to the supply of educational material, which includes the brochures created by the ASAND/Italian Alliance for Cardiovascular Rehabilitation and Prevention (ITACARE-P) working group of dietitians:

- Recommendations for lifestyle modification: eating habits;
- Characteristics of a balanced diet;
- Tips and strategies (https://www.asand.it, https://www.itacarep.it/);
- Notes for a balanced diet in Italian, English, French, Albanian, Chinese, Arabic, Spanish, Russian and Romanian versions (https://www.asand.it, https://www.itacarep.it/).

The teleconsultation ends with the coordination of nutritional care and the new monitoring plan.

Digital tele-monitoring tools: Weekly interactive food diary

The interactive food diary is a therapeutic tool that can be exchanged via the web between patient and dietitian before the nutritional teleconsultation. Two types of diary were developed, based on the type of patient. Both are asked to report the physical activity carried out according to the methods indicated by the cardiologist and/or physiotherapist.

One is aimed at patients - mainly of advanced age - at risk for malnutrition: it contains a summary table of body weight and BMI at the beginning and end of the CR, with additional fields in which the subsequent body weight and relative BMI must be entered, the latter displayed automatically once the new body weight has been filled in.

This diary presents simple instructions on items to be filled in: mealtime, food and drinks consumed (type and quantity); it allows you to assess the intake of food and nutrients and has been designed on a daily basis as well.

The second diary model is aimed at patients with modifiable risk factors related to eating habits. In addition to the previously discussed items, in this diary you can complete further data: context of the meal (where and with whom), annotations; furthermore, the objectives agreed at the time of discharge from the CR are reported, and finally specific blanks for blood test results.

This diary allows the patient to promote self-observation skills (food consumption, correlation between food and emotions, meal behavior, biological signs of hunger/satiety, etc.) and self-evaluation of one's eating habits, in order to develop the ability to change and self-control one's own lifestyle.

The use of a food diary requires the dietitian to have specific training in communication techniques, therapeutic education, counseling and/or problem solving [33].

Interactive food/nutrition knowledge questionnaire

It is the electronic and interactive form of the Moynihan questionnaire [34], created by the authors of this article as an aid to the nutrition telemonitoring and to be received in advance by the dietitian via web. The questionnaire, validated as the Italian version of Moynihan's one, is self-administered [34] within the nutritional care pathway in CR [35] in order to investigate and then verify the patient's food knowledge, which is an essential prerequisite for any educational program on nutrition [36][37][38].

Educational and informative material entitled: "Photographic food servings"

It is mainly made of pictures - sometimes modified - taken from "Scotti Bassani" photographic food atlases for portion size, for adults and pediatrics (Figure n.5) [39-40].

The goal was to create a usable tool for patients in order to make them aware and protagonists of their eating behavior, in line with the recommended servings of food [29].

It helps the patient both in completing the diary and during the telephone/video call (figure 5).

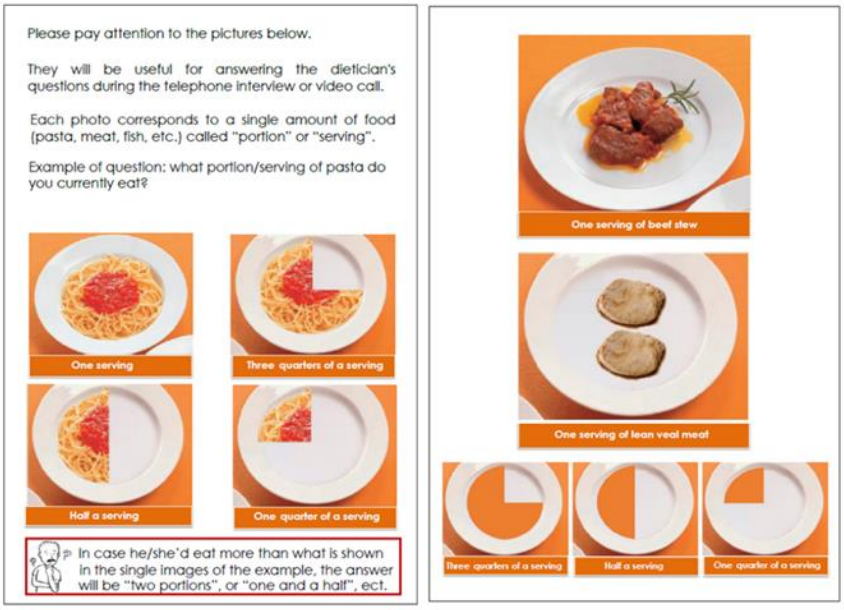

Figure 5: didactic and informative material relating to "photographic food servings"

CONCLUSIONS

Diet is an important component of lifestyle, and healthy eating has been shown to be associated with a reduction in secondary events in patients with cardiovascular disease [41].

Teleconsultation could optimize the effectiveness of current nutritional care and the adherence of patients to nutritional treatment plans, through a reduction in waiting times, costs and general inconveniences for patients [31][42], who would not be forced to move to access health facilities; all this has the purpose of developing the prospects of a proximity medicine and territorial health care to which the national recovery plan also refers.

Patients assisted with telemedicine systems in CR require training, in consideration of the fact that for the most part they are elderly people, with little familiarity with technologies. Furthermore, they must be reassured that, even at a distance, assistance and treatment for their pathology are still guaranteed [43].

"It is important to build rapport with the patient during and after the e-nutrition clinic visit. Active listening and empathy are key to building a healthy interaction with a long-term follow-up" [44].

Dietitians must acquire and maintain adequate skills, consistent with the technological development, and understand how the digitalization/computerization of health interventions can be used to support and improve their clinical practice, while remaining effective in evidence-based nutrition assistance [45].

A survey conducted by ASAND, on the use of telenutrition among italian dietitians during the Covid-19 pandemic, observed difficulties in performing nutritional assessment and monitoring activities as some of the main obstacles to its use, according to 24.4% out of 436 analyzed responses [46].

One of the strategies to obtain effective nutritional counseling is the use of dietary supporting tools [47].

Nutritional follow-up consultations, using telephone/video feedback and nutritional tools such as food lists or serving examples, help improve compliance with dietary advice in the prevention and management of chronic diseases [24].

We hope that the development of ad hoc tools like the ones described throughout the article will become an aid to colleagues in carrying out their daily work.

Our future goal is to develop a research project involving CR centers to establish the effectiveness of using the toolkit in clinical practice, in terms of desired outcomes and follow-up dedicated time

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