Nutrition assessment – Home-based nutritional therapy

Avaliação nutrológica – Nutroterapia domiciliar

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The Guidelines Project, an initiative of the Brazilian Medical Association, aims to combine information from the medical field in order to standardize procedures to assist the reasoning and decision-making of doctors.
The information provided through this project must be assessed and criticized by the physician responsible for the conduct that will be adopted, depending on the conditions and the clinical status of each patient.

Evidence collection method

This policy followed the pattern of a systematic review with retrieval of evidence based on the principles of evidence-based medicine (EBM), according to which clinical experience is integrated with the ability to critically analyze and rationally apply scientific information, thus improving the quality of medical care. EBM uses existing scientific evidence available at the time, with good internal and external validity, applying its results to the clinical practice.[1,2] (**D**)

Systematic reviews are considered today as level I evidence for any clinical question as systematically summarize information on a particular topic based on primary studies (clinical trials, cohort studies, case-control or cross-sectional studies). The method used for this is reproducible and integrates information on effectiveness, efficiency, efficacy, and safety.[1,2] (**D**)

We use a structured way to ask the question, summarized by the acronym PICO, where P is the patient or population; I, the intervention or indicator; C, comparison or control; and O, the outcome. Based on structured question, the keywords or descriptors that will form the basis of the search for evidence in the various available databases are identified (Annex I).[1,2] (**D**)

Clinical question

What are the indications, benefits and risks of home-based nutritional therapy in newborns, children, adolescents or the elderly?

Grade of recommendation and strength of evidence

- A: Experimental or observational studies of higher consistency.
- B: Experimental or observational studies of lower consistency.
- C: Case reports/non-controlled studies.
- D: Opinions without critical evaluation, based on consensus, physiological studies, or animal models.

Objective

To determine the role of home-based nutritional therapy in the guidance, diagnosis, and nutritional management of children, adolescents, and adults.

Conflict of interest

No conflict of interest was declared by the participants in the development of this guideline.

Introduction

Nutritional therapy assessments involve the individualized preparation of nutritional guidance with counseling, nutritional education and dietary intervention for healthy or sick individuals. In the clinical appointment, the patient is examined individually, with data collected on the pathophysiological situation, past, present and family clinical history, nutritional, physical and biochemical status, so that the nutritional diagnosis and nutritional conduct can be formulated.

Breastfeeding

The importance of breastfeeding and a healthy supplementary diet are factors that promote maternal and child health. It has become common to start the introduction of water, teas, and other types of milk during the first month of life, and the consumption of coffee, soft drinks, and cookies among children between 9 and 12 months of age is high, factors that are harmful to health.[3] (**B**)

The program Ten Steps for Healthy Feeding from Birth to 2 Years of Age aims to support healthcare professionals and promote healthy eating habits for children under 2 years of age, prioritizing exclusive breastfeeding for the first 6 months of life and a supplementary diet of sufficient quantity and quality in order to provide for the growth and development of children. A group of professionals received educational materials to deliver to the mothers of children under 6 months of age, with information on the importance of not offering other liquids and foods, as well as breastfeeding, introducing meat in order to prevent anemia, suitable consistency of food for the baby, the importance of not replacing baby food with sandwiches or snacks, and example food compositions for meals. Another group of mothers formed the control group, where the professionals did not receive retraining on the subject or the educational materials. The breastfeeding rate was 66.1% (n=409) at 6 months of age. After the intervention, the group significantly increased the exclusive breastfeeding time (2.34±1.63 months) compared to the control group (1.92±1.60 months). The prevalence of children with exclusive breastfeeding for less than one month decreased significantly in the intervention group (27.7%) compared to the control group (40.5%). The impact of the intervention was also positive among children aged 6 to 9 months due to increased consumption of fruits, beans, meat (≥ 4 times/week), and liver (once per week).[3] (**B**)

The aim of the intervention study is to encourage the practice of breastfeeding, dietary adequacy, and the growth of infants and children (6 to 15 months). The mothers were encouraged to have questions and concerns about the child nutrition elucidated, to undergo cognitive skills training with the practice aimed at influencing self-efficacy, to take a course to increase practical knowledge about selection and preparation of new recipes and the mobilization of social support. The nutritional intervention package included: 1) education and counseling of mothers, 2) training about nutritional counseling and monthly home visits, 3) meetings to raise awareness, and 4) supervision by community-based nutrition advisors. Thus, the intervention group received this nutritional counseling package, which was planned and well prepared with closed questions, details of the process and plausible guidance, while the control group received routine general health visits.[4] (**B**)

Recommendation

Conveying the information in a personalized manner is indicated for nutritional education in the child care setting, involving educational materials with information about the scheme for introducing supplementary foods, positively influencing linear growth, changes in length in relation to age, feeding practices, nutrient intake, and level of knowledge about the recommended practices.

Children and adolescents

We studied healthy infants and children (6 to 24 months old) consuming foods combined with breastfeeding for a period of 6 months, and divided them into three groups: 1) those who received fortified supplementary food and nutritional education, 2) those who received granules in a fortified sachet (20 g for children under 1 year or 40 g for children over 1 year) and nutritional education, and 3) those who received isolated nutritional education as a control. The supplements were delivered to the mothers monthly and comprised 7.9 mg of iron and 6.5 mg of zinc in the 20 g sachets, and 15.9 mg of iron and 13.0 mg of zinc in the 40 g sachets; protein-to-energy ratio of 3.73 g/100 calories and fat-to-energy ratio of 1.87 g/100 calories. The sachet was added once a day to the child's meal after being cooked. Nutritional education included the importance of micronutrients, and various ways of including foods high in iron and zinc as well as other sources of foods rich in different micronutrients that are easily added to a child's diet. This was given to the mothers once a month. A food frequency questionnaire was applied monthly, showing that there was no change in the common food intake of the patients in each group. The hematological markers showed improvements in hematocrit (mean HT group 1: 3.20±4.4%, group 2: 0.65±2.7%), mean corpuscular volume (mean MCV group 1: 4.30±8.3 ff, group 2: -0.008±8.8 ff), and hemoglobin (mean Hb group 1: 1.29±1.6 g/dL and group 2: 0.37±1.1 g/dL), thus the rate of anemia decreased by 67% (Hb < 10 g/dL) in group 2, 27% in group 1, and 22% in the control group. There was no information regarding speed of weight/height gain with the intervention.[5] (**B**)

A systematic review gathered data related to the change in diet, physical activity and the effect on the prevention of obesity in children and adolescents (2 to 18 years). In one study, the nutritional intervention meant encouraging the consumption of fruits and vegetables and reducing the intake of foods high in fat and sugar, as well as stimulating physical activity. Another study assessed the effect of the intervention on the acts of watching television, consuming snacks and sweets, eating out and engaging in physical activity. The third study assessed the effect of dietary intervention on the intake of fat, fruits and vegetables, the act of watching television and physical activity. None of these presented significantly beneficial results on the body mass index (BMI), weight or prevalence of excess weight, the time spent in front of the television, or the minutes of

physical activity per day. All of the studies showed an improvement in the intake of fruits and vegetables.[6] (**A**)

When assessing 9 year-old girls with a BMI < p85th who received a diet high in calcium for 104 weeks as an intervention, a total increase in energy consumption was found, with no significant difference in fat mass or weight, or the time spent practicing physical activity.[6] (**A**)

A study involving 878 participants aged 11 to 15 years, with dietary intervention and physical activity through computer-assisted assessment, monthly emails, telephone counseling and family participation found no significant difference in BMI and physical activity after 52 weeks of intervention, and there was no result in relation to calorie, fruit, and vegetable intake.[6] (**A**)

In order to evaluate the effects of dietary supplementation and home education on the physical and intellectual development of children at risk of malnutrition, authors selected households containing a pregnant woman and one or more children under 5 years of age, at least half of whom were below 85% of the weight-for-age according to Colombian standards. The population was divided into six groups: 1) those who only received medical care, 2) those who participated in the home-based education program, 3) those who received supplementation from the beginning of the study until the child was 6 months old, 4) those who began supplementation when the child was 6 months old with monitoring until they turned 3 years old, 5) those who received supplement from the beginning of the study until the child turned 3 years old, and 6) those who received supplement from the beginning of the study until the child turned 3 years old and participated in the home-based education program. Primary school teachers taught the mothers practical techniques to improve the psychosocial stimulation of their baby. Each residence was visited twice a week from the beginning of the study until the child completed 36 months of age. Supplementation was undertaken in accordance with the energy and protein deficiency of each family, based on the local daily recommendation. Bread enriched with protein (daily supply of 1,664 kcal and 60 g protein), skimmed milk (daily supply of 1,460 kcal and 148 g protein), and cooking oil (1,198 kcal daily supply and 0 g of protein) were provided for 1 year, with 623 calories and 30 g protein distributed to each family member. Pregnant women and those breastfeeding received an additional 233 kcal and 8.4 g of protein per day. Consumption was assessed by 24-hour dietary recall, using five indicators: daily energy consumption, daily protein consumption, calories per food group, animal protein percentage, and starch density (total percentage of calories derived from cereals, starchy roots or tubers, and starchy fruits). Supplementation considerably increased protein consumption, exceeding the recommended daily levels, while the group without supplementation remained relatively unchanged and was significantly below the level reached by the supplemented groups. The energy consumption was less pronounced, but there was still a difference between the groups ($p<0.01$), and the calorie consumption for the groups without supplementation tended to decrease over time. At the start of the study, caloric consumption comprised 15% fat, 9% protein, and 76% carbohydrates. In the supplemented groups, the source of calories remained unchanged, the fat source fell (12%) and the protein source increased (13%).[7] (**B**)

Malnourished children aged 10 to 60 months living in Malawi who were brought to a nutritional rehabilitation unit were included in a research project if they were stable in relation to weight-to-height, had mild edema (< 0.5 cm), or both, and a good appetite [if the child consumed food when offered and observing the child consume a test dose of 30 g of ready-to-use therapeutic food (RUTF)]. The children were divided into a standard treatment group and another receiving RUTF at home. Weight, height, and mean arm circumference (MAC) were measured every 2 weeks, and the children continued to be fed at the hospital or receive additional supplement at home with cereals and vegetables. RUTF was produced by a local cooperative composed of an energy dense fat paste (25% peanut butter, 28% sugar, 30% whole milk, 15% vegetable oil, and 1.4% imported vitamins and minerals) packaged in plastic bottles containing 260 g. Each bottle was recommended for daily consumption by each malnourished child, with 175 calories, 5.3 g protein and the micronutrient content reaching the WHO's daily recommendation. After hospital discharge, the children undergoing standard treatment received a corn (80%) and soy (20%) supplement mixed with flour (enriched with vitamins and minerals), which was meant to be consumed seven times a day. Children in the RUTF group were more likely to attain a weight/height score > -2, with increasing weight (4 week rate = 3.5±3.7 kg *vs.* 2.0±6.9 kg), height (8 week rate = 0.19±0.59 mm/day *vs.* 0.12±0.29 mm/day), and mean upper arm circumference (4 week rate = 0.32±0.41 mm/day *vs.* 0.23±0.33 mm/day) in a better way than the standard treatment group. They were also less likely to relapse or die, or to develop fever (in the first 2 weeks: 68% *vs.* 53%), diarrhea (in the first 2 weeks: 79% *vs.* 72%) or cough (in the first 2 weeks: 82% *vs.* 70%), all of which is significant data.[8,9] (**B**)

Recommendation

There is an absence of good quality evidence to show that dietary guidance combined with physical activity, with the interventions conducted in a domestic environment, prevent obesity in the population aged 2 to 18 years. Likewise, a calcium-rich diet in girls aged 9 years for 104 weeks did no present any benefit on weight, fat mass or physical activity.

For children aged 6 to 24 months with anemia, monthly meetings with an explanation of micronutrients, and guidance on preparations and recipes are recommended, as well as, in severe cases, 6 months of iron- and zinc-enriched dietary supplementation, with one sachet to be mixed with meals.

The home-based treatment with energy, protein, and micronutrient dense paste is effective in situations where malnutrition is chronic, especially in impoverished locations.

Elderly

Malnourished frail elderly individuals were selected for the study; they were willing to improve their health status and receive home-based strength training and nutritional counseling. The participants were visited by friends who volunteered (≥ 50 years) twice per week, for 1 hour over 6 months. The control group only received visits at baseline and after the 10th week, receiving guidance on nutrition and physical activity until completing 3 months of the study. The intervention group received the visits with guidance on nutrition and physical activity. Nutritional guidance (NG) covered the intake of fluids, the intake of animal and vegetable protein, and energy intake through simple booklets, ideas on how to enrich foods with protein, recipes for high-protein and high-energy meals, a representation of the variety of foods, and a food card showing portion sizes. A game was used for the elderly people to show the amount of food eaten the previous day. Motivational interview techniques were also used, including a section for setting individual targets and tools to enhance self-efficacy.[10] (**B**)

All of the participants (> 65 years) residing in a nursing home were interviewed using the Mini Nutritional Assessment (MNA) to evaluate their nutritional status and other personal information. Anthropometric measurements [height, weight, MAC and calf circumference (CC) were also measured as indicators (baseline up to the end of the fourth week of intervention], as well as laboratory tests for Hb, serum albumin and cholesterol. The supplementation was 50 g/day of a soy protein preparation providing approximately 9.5 g of protein, 250 kcal and all essential micronutrients. The supplement was prepared as a "hot drink" and served as part of an afternoon snack for the intervention group (n=39). Supplementation was suspended if the MNA score was > 24 or BMI > 24 kg/m^2 in the next measurement (every 4 weeks). The participants in the control group (n=43) and those who were assigned to the intervention group, but were not in the condition stated above, received routine care and normal meals, including an afternoon snack (usually hot soup). Thirty of the 39 patients in the intervention group met the criteria to receive the supplement at the start of the study. Seventeen (17) remained on the supplement until the end of the study, eight became eligible after the first 4 weeks, five were well enough to not receive any supplement during the entire 24 week period, while 13 progressed to the point of removing the supplement between the 1st and 4th week. The intervention showed significant improvement (or minimized the loss) of weight (12th week: -0.19±1.40 kg; 24th week: 0.12±2.62 kg), BMI, MAC (12th week: 0.08±0.81 cm; 24th week: 0.17±1.02 cm), CC (0.28±0.85 cm; 0.43±1.44 cm), albumin serum levels (0.14±0.29 g/dL; 0.14±0.34 g/dL), and cholesterol concentration (2.12±20.3 mg/dL; 5.47±25.3 mg/dL), all with $p<0.05$. In the control group, there was a decrease in these indicators ($p<0.05$). The effect of the intervention stratified in accordance with the initial nutritional status using MNA as a risk of malnutrition (score between 17 and 23.5) demonstrated an improvement of the same indicators (weight: -0.11±1.47 kg, 0.01±2.96 kg; MAC: 0.25±0.81 cm, 0.36±1.04 cm; CC: 0.27±0.85 cm, 0.58±1.36 cm; albumin: 0.14±0.30 g/dL, 0.13±0.38 g/dL; cholesterol: 3.15±23.0 mg/dL, 9.20±26.1 mg/dL, 12th and 24th weeks, respectively) ($p<0.05$), with no significant result for malnourished participants (score < 16.5). Similar results were obtained in other studies.[11,12] (**B**)

In a nursing home, residents with malnutrition or at risk of malnutrition (MNA < 24 and BMI ≤ 22kg/m^2, with perceived low appetite, and/or ≥ 5% weight loss within 3 months or ≥ 10% in 6 months) were selected, with one intervention group (IG) and one control group (CG). The intervention group received two bottles of nutritional supplement (125 mL/bottle containing 2.4 kcal/mL, 12 g of protein and 300 kcal/bottle) per day between meals, in order to prevent a satiety effect on normal food intake, over 12 weeks. The nursing home staff was instructed to encourage residents to consume the amount offered, support the consumption of varied flavors, and provide smaller portions more often. The control group received the usual care, which included the provision of homemade snacks or nutritional supplement when prescribed by the physician or provided by family members. Visits were

made daily at the start of the study and over the week, divided over 3 times/week. In order to obtain data on the regular consumption of foods, a dietary recall assessment was applied (two consecutive days per week and 1 day at the weekend). The participants (87±6 years) who were in the IG had a significantly higher intake of total energy and protein (1,263±372 to 1,615±442 kcal and 41.3±15.1 to 54.9±18.2 g, both p<0.001), with no significant difference compared to the control group. The IG had a higher intake of micronutrients, except for vitamin B12 and vitamin A, magnesium, and calcium (p<0.05) in relation to the control group. In the IG, the average initial weight (53.7±9.2 kg) increased by 1.2±2.4 kg (p=0.001), while the CG had a decrease of -0.5±2.5 kg.[13] (**B**)

Another study was done on the population of homes for the elderly (91±7 years of age), but with a BMI < 18,5 kg/m^2, without the presence of acute illness in order to assess whether daily energy intake could be increased through the enrichment of food without increasing meal size, as well as improving nutritional status. The local diet was assessed using the CORA, and the anthropometric measurements taken included mid-upper arm circumference (MUAC), weight, and BMI (at baseline and after 12 weeks). The intervention group received usual food, enriched with standardized amounts of energy dense foods [double cream (50 mL) was added to cereal, oatmeal, soup, and desserts; butter (8 g) was added to potatoes, and 250 mL of whole milk malted was offered every night]. The maximum potential increase in daily energy intake was 399.85 kcal (1,673 kJ). The control group maintained their normal diet, with no significant difference between groups in the consumption of energy and nutrients, except for fat intake (which was higher in the intervention group, p=0.014). Weight increased significantly in the intervention group, and decreased in some members of the control group, 0.14-2.41 kg and -1.1-0.6 kg, respectively; MUAC and BMI were also better in the intervention group.[14] (**B**)

Patients aged ≥ 65 years and at nutritional risk, according to level 1 of the Nutritional Risk Screening (NRS-2002), BMI < 20.5 kg/m^2, and/or weight loss in recent month, and/or reduced food intake during the last week were selected for research in which the intervention consisted of a comprehensive nutritional assessment in the first home visit as a basis for the development of a nutritional care plan compatible with the estimated nutritional requirements and nutritional recovery goals. The basal metabolic rate was assessed using equations and a factorial method to account for weight gain factors and to estimate the total energy and protein needs of each participant using a 4-day dietary recall assessment. The nutritional strategy was implemented through three visits, including ways to consume energy and protein, attention to nutritional risk factors, time, volume and frequency of meals, nutrient recommendations, weight monitoring, and delivery of booklets with information. There was no difference in nutritional status between the intervention and control groups, but body weight (mean 1.4 *vs.* -0.4 kg), energy value (mean 310.4 *vs.* 47.7 calories/day), and protein intake (mean 11 *vs.* 2 g/day) were higher in the group that received the intervention, all of which is significant data. Furthermore, this group had an increased intake of oral nutritional supplements (40 *vs.* 10%, p<0.001).[15] (**B**)

Recommendation

In needy and malnourished elderly individuals, the use of educational materials with clear and colorful photos depicting food and portions, practical and simple recipes with high protein and high calorie foods, as well as periodic visits (1 to 2 times/week) lasting 1 hour for motivation, goal setting, and providing explanations is recommended. Physical activity should also be encouraged.

To improve the nutritional status (weight, BMI, MAC, CC, serum cholesterol, and albumin levels) people living in nursing homes at risk of malnutrition should receive supplementation through a preparation in the format of hot soy protein milk (50 g/day) enriched with 9.5 g of protein, 250 calories and all of the essential micronutrients, once per day. Liquid supplementation composed of 2.4 kcal/mL, 12 g of protein and 300 kcal/bottle, twice per day between main meals is also indicated for positive results in these indicators.

In a malnourished elderly population (BMI < 18.5 kg/m^2) it is possible to improve weight, BMI, and arm circumference values, which are malnutrition indicators, with increased energy and habitual dietary fat intake (three intermediate meals such as snacks, with an additional value of approximately 400 calories/day) without the use of supplementation. This intervention does not lead to a lower cost for nursing homes; however, the results are moderate.

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Annex I

Clinical question

What are the indications, benefits and risks of home-based nutritional therapy in newborns, children, adolescents or the elderly?

Structured question

- P: newborns, infants/children, adolescents or elderly individuals
- I: home-based nutritional therapy
- C: ----------
- O: benefit or harm

Strategy for search of evidence

- #1 – (Nutrition Therapy OR Diet Therapy OR Nutritional Support OR Enteral Nutrition OR Parenteral Nutrition OR Parenteral Nutrition, Home OR Feeding Methods) AND (Home OR House OR Home Care) = 16,804
- Methodological search filter – (random* OR ((prognos*[Title/Abstract] OR (first[Title/Abstract] AND episode[Title/Abstract]) OR cohort[Title/Abstract])) = 1,627,707

1st Retrieval = 2,908

- (((Nutrition Therapy OR Diet Therapy OR Nutritional Support OR Enteral Nutrition OR Parenteral Nutrition OR Parenteral Nutrition, Home OR Feeding Methods) AND (Home OR House OR Home Care))) AND (random* OR ((prognos*[Title/Abstract] OR (first[Title/Abstract] AND episode[Title/Abstract]) OR cohort[Title/Abstract])))

Studies retrieved

The scientific database searched was PubMed-Medline. A manual search from the references of reviews (narrative or systematic) was performed.

The number of studies retrieved until the last day of searching (July 29, 2015) according to the final search strategy was 2,908. After reading the titles, 154 were selected. Of these, 13 were retrieved based on exclusion criteria.

Exclusion criteria

The selection of studies was carried out with the first exclusion stage conducted by two researchers with skills in the elaboration of systematic reviews assessing the titles and abstracts, in an independent and blinded manner. When the title and summary did not provide clarification, we sought the full article. Next, the studies with potential relevance were separated. Studies that included psychiatric patients or those with other specific diseases, under hospital or outpatient care, with terminal diseases, kidney disease on dialysis, senile dementia, non-specific assessment tests, interventions not related to PICO, and studies written in other languages were excluded.