

Adherence to nutritional orientations: a literature review

Adesão às orientações nutricionais: uma revisão de literatura

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Abstract

Patient compliance with nutritional guidelines is essential to achieve the results expected from nutritional education. The phenomenon of adherence and non-adherence brings great impact on morbidity and mortality in individuals affected by chronic diseases and it is one of the major problems faced by health professionals. The aims of this study were to identify how adherence to nutritional guidance and its determinants are assessed and to summarize ways to improve adherence. A literature review has been made in the electronic databases SciELO, LILACS, PubMed and ClinicalKey from 2005 to 2015. Throughout the literary review, it was found that adherence assessment can be subjective or objective and that adherence has been evaluated with different types of instruments because of the great difficulty posed by the measurement of this variable. Multiple interfaces influence adherence to treatment, e.g., patient, disease, therapy, socioeconomic and cultural aspects, health system and relationship with healthcare professionals. Because the dimension of the topic of adherence is complex, there is no method or instrument that fits all the objectives and studies. However, methodological studies are needed to develop and validate instruments to assess adherence to nutritional orientations.

Keywords: Patient Compliance. Nutrition Therapy. Orientation. Evaluation. Guideline Adherence.

Resumo

A adesão dos pacientes às orientações nutricionais é imprescindível para que se obtenham os resultados esperados da educação alimentar. O fenômeno da adesão e não adesão traz grande impacto na morbimortalidade de indivíduos que são acometidos por doenças crônicas e é um dos problemas mais importantes enfrentados pelos profissionais de saúde. Este trabalho teve como objetivo identificar como é avaliada a adesão às orientações nutricionais e seus determinantes, além de sumarizar formas para melhorar a adesão. Realizou-se uma revisão de literatura nas bases de dados eletrônicas SciELO, LILACS, PubMed e ClinicalKey, no período de 2005 a 2015. Ao longo da revisão literária, constatou-se que a avaliação da adesão pode ser subjetiva ou objetiva e que é feita com diferentes tipos de ferramentas por causa da grande dificuldade encontrada na maneira de mensurar essa variável. Várias interfaces influenciam a adesão ao tratamento, como o paciente, a doença, a terapia, os aspectos socioeconômicos e culturais, o sistema de saúde e o relacionamento com os profissionais de saúde. Devido à complexidade da dimensão da temática adesão, não existe um método ou instrumento que se adapte a todos os objetivos e análises. Contudo, são necessários estudos metodológicos que elaborem e validem instrumentos de aferição da adesão às orientações nutricionais.

Palavras-chave: Adesão do Paciente. Terapia Nutricional. Orientação. Avaliação. Fidelidade a Diretrizes.

Introduction

Nutritional education actions have a prominent place in treating several diseases, such as cardiovascular and pulmonary ones. And adherence to guidelines is essential to achieve results expected from food education.¹

Adherence to guidelines proposed influences diseases treatment success and is a multifactorial process established through a partnership between the health professional and the patient, encompassing several aspects, ranging from services frequency to the development of self-care awareness and maintenance of health seeking, forming attitudes, habits and healthy eating practices.^{1,2}

Treatment of chronic diseases, for example, requires greater patient commitment and continuity, which justifies the fact that chronic patients have less adherence to the treatment, which often presents complex therapeutic regimens. It is estimated that about 50% or more of these patients

do not follow treatment properly.²⁻⁵ The phenomenon of adherence and non-adherence has great impact on morbidity and mortality of individuals affected by chronic diseases.⁶

Low adherence to treatment is one of the most important problems faced by health professionals.^{7,8} Noncompliance may lead to unnecessary adjustments in therapy due to the lack of positive responses and health professionals' frustration, since goals are not achieved. And, above all, increased costs in health care, with higher rates of hospitalization and treatment of complications.^{3,9}

Impact of diseases on people can not be described only by objective health measures. Thus, creation and adaptation of instruments that can objectively capture subjective attributes of different themes related to the health-disease-care process have been encouraged. Such instruments can provide approximation with reality in order to contribute to more effective interventions, resulting in increased adherence.⁶

Relevance of the instruments for evaluating adherence to public health and the need to fill the gap with regard to adherence to non-pharmacological treatment is perceived since most of the methods used to assess adherence are focused only on pharmacological treatment and it is already well established in the literature that there is great difficulty in adhering to non-drug treatment.^{3,10}

Treatment of diabetes, for example, should start with nondrug therapies, such as lifestyle interventions, since they are more effective in controlling the disease.¹¹ Smoking and lack of exercise are risk factors for coronary artery disease (CAD) and better adherence to lifestyle changes after an acute coronary syndrome is associated with lower risk of recurrent cardiovascular events.¹² Healthy eating habits and regular practice of physical activity are extremely important tools in prevention and treatment of various diseases.¹³⁻¹⁶

Thus, acknowledging this issue complexity, this study aims to identify how adherence to nutritional guidelines and their determinants is evaluated, in addition to summarizing ways to improve adherence.

Method

It is a study of a narrative review of the literature guided by the following research question: How is adherence to nutritional guidelines evaluated? Search of articles was carried out in electronic databases Scientific Electronic Library Online (SciELO), *Literatura Latino-Americana e do Caribe em Ciências da Saúde* (LILACS), Public Medical (PubMed) and ClinicalKey. The period delimited for researching the articles was from January 2005 to June 2015. The following descriptors were used: "patient compliance", "nutrition therapy", "orientation", "evaluation", "guideline adherence" and their versions in Portuguese and Spanish, according to the terminology in health (structured and trilingual thesaurus) DeCS (Health Sciences Descriptors), the Brazilian government Virtual

Health Library and (comprehensive controlled vocabulary) MeSH (Medical Subject Headings). The following combinations of terms were made: “patient compliance” and “nutrition therapy”; “guideline adherence” and “nutrition therapy”; “guideline adherence” and “evaluation”; “orientation” and “nutrition therapy”; “orientation” and “patient compliance.”

Inclusion criteria were: articles available in full in Portuguese, Spanish or English, published within the period set, approaching the issue of adherence and discussing the subject by establishing some relationship with nutritional treatment. Articles which were excluded: those mentioning the word adherence without discussing the topic, those approaching the adherence topic without showing in any way how adherence would have been measured or determined and those addressing pharmacological treatments without mentioning non-pharmacological treatments. Thus, 56 articles were selected from journals.

Results and Discussion

Adherence to treatment does not have an established and universally accepted definition, based on data types, instruments and measurement methods.⁵ In terms of definition, evaluation and types of interventions needed to increase it, studies have found some great challenge.¹⁷ There are great difficulty and variability in definition of criteria adequately revealing adherence, which makes it difficult to identify the lack of adherence, as well as to quantify it.^{3,6,9,10,18,19}

In view of this reality, adherence can be defined as a situation in which patients' behaviors correspond to guidelines provided by health professionals. Or else as patients' active participation and voluntary collaboration in mutually agreed upon behavior in order to produce desired therapeutic or preventive results.^{6,17}

Despite the availability of effective treatment for chronic diseases such as hypertension and diabetes, control is difficult and is far from ideal because of the lack of adherence to guidelines proposed, which influences chronic diseases inadequate evolution.^{4,10} Improving adherence may have more impact on the population's health than any other improvement in specific medical treatments,⁴ being the most important factor for effective control of various diseases.¹⁸

Patients with chronic diseases do not always have an immediate discernment of gains that self-care behaviors can provide, which may contribute to non-adherence to treatments. In the case of arterial hypertension, patients, who are often asymptomatic, do not accept that they have the disease, especially when this diagnosis implies change in habits considered pleasant, constructed over time, or an obligation to use medications permanently.^{20,21} To increase the likelihood of patients' adherence to treatments it is important that they learn to relate the following up of proposed guidelines and the good consequences from these.⁷ Transformation in the way of

thinking of individuals and professionals involved in this process is also essential¹¹ because divergent perspectives on disease and treatment among patients and health professionals do not make compliance easy.⁵ It is imperative to sensitize patients to adopt new habits and make sure that they understand the importance of the demands imposed by the treatment, besides the development of a good professional-patient relationship.^{7,11} Change in behavior must be permanent and this depends on their friendly coexistence with the disease,²⁰ which should not be seen as a problem but as some challenge to be faced.¹⁴

Training in correspondence is one of the techniques used in the health area, especially by psychologists following the analytic-behavioral model, which assists patients in observing their own behaviors (self-observation) in order to evaluate if their actions to the treatment coincide or not with what was advised by health professionals and to verify which variables interfere with adherence through systematic records of the behavior. Another technique is patients' verbal report about their self-care actions, in which target behaviors are orally described. Although there may be omission of noncompliance behaviors, the literature indicates that reliable data can be obtained when specific behaviors are reported at recent intervals, such as those corresponding to 24 hours prior to the data collection procedure.⁷ Therefore, it is important to highlight the use of diet surveys, such as the 24-hour dietary recall (24HR), which, despite its limitations, such as underestimation of food consumption, is an important instrument for evaluating food consumption, easy to use, low cost and can be used by illiterates.^{22,23} By the collection of dietary information, one can discover which changes should be made.²⁴ However, measuring adherence to diets is also complex because of the difficulty in scaling up actual eating changes.¹⁵

Adherence has been evaluated with different types of tools due to the great difficulty found in the way of measuring this variable; in fact, evaluation of adherence to non-pharmacological treatments is not assessed as such but is generally integrated in self-management behaviors or self-care activities.^{5,25}

Adherence evaluation can be subjective or objective. Subjective ones include obtaining information on the adherence level by reports from patients, relatives or health professionals through questionnaires, diaries or interviews. Records and interviews are widely used because they present the patients' own assessment of their adherence.^{17,25} As for objective measurements, they have the accuracy of objective data such as anthropometric measures and laboratory tests.²⁵

Subjective measures may overestimate adherence since self-reported information may generate errors due to memory or other distortions.^{15,25} However, subjective self-report techniques are easy to use and may allow the identification of a group of patients with non-adherence behavior, although with less sensitivity, which helps to identify reasons for this attitude and in the development of strategies to improve adherence.²⁵ Especially in the nutritional context, what has been done is to

consider the reported frequency of an eating behavior since self-assessment methods are much more useful than the more objective ones.¹⁷ Another difficulty in the evaluation of self-reported adherence is that there are no validated questionnaires for this purpose. Therefore, what many studies do is use several questionnaires or adapt a questionnaire from another study or to develop their own questionnaire to assist in determining degrees of adherence.²⁵

For Debussche,⁵ assessing adherence through biochemical parameters is complex because moderate changes in diet or physical activity may occur without any obvious effect being observed in biomedical outcomes. Therefore, effectiveness of educational interventions on adherence and the link between adherence and biomedical criteria still need to be clarified.

Among the studies analyzed in this study, the data in Table 1 summarize the main methods and instruments used in assessing adherence found in the bibliographic search.

Chart 1. Type of study, instrument used, study population, place/year where they were performed, advantages and/or disadvantages of the instrument used.

Study	Instrument adopted	Study population	Location/year	Advantages and/or disadvantages of the instrument
Bueno et al. Retrospective, longitudinal, descriptive and quantitative	Permanence of the individual until the last meeting, in addition to anthropometric measurements and food records	Overweight adults (n = 116)	Public university community of Ribeirão Preto, SP, Brazil (2011)	Anthropometric parameters: simple, low cost, but can result in systematic error in estimation of body composition, besides the need for trained evaluators. Food record: it does not depend on the memory. However, consumption can be changed and requires a high level of collaboration.
Figueiredo and Asakura Cross-sectional description	A questionnaire with open and closed questions	Hypertensive patients (n = 54)	Health Center of São Paulo, SP, Brazil (2010)	Some items may represent broad concepts

to be continued

Continuation of Chart 1

Study	Instrument adopted	Study population	Location/year	Advantages and/or disadvantages of the instrument
Giroto et al. Transversal, exploratory	Self-report through an interview	Hypertensive individuals (n = 380)	Area of coverage of a Brazilian government Family Health Care Unit (USF, in the Portuguese abbreviation) in Londrina, PR, Brazil (2013).	Easy to use and can allow the identification of a group of patients with non-adherence behavior. However, it may generate errors due to memory or other distortions
Silva et al. Longitudinal of intervention	Dietary, anthropometric, biochemical and clinical parameters	Hypertensive women (n = 27)	Unit for Primary Health Care of Ponte Firme, MG, Brazil (2014)	Accuracy of objective data. However, moderate changes in diet or physical activity may occur with no obvious effect observed in biomedical outcomes, or vice versa.
Campuzano et al. Pretest/posttest	Food records for three weeks	Diabetic patients (n = 90)	Health centers in Mexico City (2013)	It identifies types of foods and preparations consumed and meal times. However, it requires time and the individual should know home measures.
Guimarães et al. Controlled and open intervention	Dietary repercussions before and after intervention and attendance at meetings.	Patients with two or more associated cardiovascular risk factors (n = 80)	Nutrition outpatient clinic at a public hospital in Brasília, Brazil (2010)	The higher number of consultations is related to higher adherence.

to be continued

Continuation of Chart 1

Study	Instrument adopted	Study population	Location/year	Advantages and/or disadvantages of the instrument
Dalcin et al. Transversal, prospective	Self-report through an adapted questionnaire	Patients with cystic fibrosis (n = 38)	Public hospital of Porto Alegre, RS, Brazil (2005-2007)	There are no validated questionnaires for this purpose.
Mussi et al. Transversal	Questionnaire developed and validated in Brazil for use in patients with HF.	Patients with heart failure (n = 340)	Two reference institutions in the cities of Porto Alegre, RS, and Niterói, RJ, Brazil (2015)	Easy to use May generate errors due to distortions
Nascimento et al. Transversal	Self-report of following a dietary plan or not	Diabetic patients (n = 34)	Public hospital of Curitiba, PR, Brazil (2014)	Easy to use, but depends on memory or can cause distortions
García-Meseguer et al. Transversal	Two non-consecutive 24HR, HEI and Mediterranean Diet Score	Students (n = 284)	Spanish university, Albacete, Spain (2014)	24HR: Easy-to-use, inexpensive tool that can be used on illiterates. It has limitations, such as underestimation of food consumption. Diet scores: They assess the quality of individual and population diets in terms of compliance with dietary guidance. They require trained interviewers.
Torrado et al. Longitudinal	MEDAS questionnaire	People with excess weight (n = 99)	A health unit that emphasizes the provision of pharmaceutical services in Madrid, Spain (2014)	Adherence to the Mediterranean dieting standard

to be continued

Continuation of Chart 1

Study	Instrument adopted	Study population	Location/year	Advantages and/or disadvantages of the instrument
Gopinath et al. Cohort	FFQ at baseline and total diet scores	1,305 and 895 participants with complete data after five and ten years respectively	Sydney, Australia (2014)	FFQ: An inexpensive and relatively simple method. It depends on memory. It does not estimate absolute consumption. Diet scores: They also study the health benefits of a given dietary pattern. They require trained interviewers.
Fung et al. Prospective cohort	FFQ at baseline and score based on foods emphasized or minimized by the DASH diet	Nurses (n = 88,517)	11 states in the USA (2008)	–

24HR: 24-hour dietary recall; HEI: *Healthy Eating Index*; MEDAS: *Mediterranean Diet Adherence Screener*; FFQ: Food frequency questionnaire; DASH: *Dietary Approaches to Stop Hypertension*

Several studies have discussed educational approaches to improve adherence to treating patients with heart failure (HF).²⁶⁻³⁰ HF nutritional therapy is directly related to complex therapeutic procedures including dietary restrictions of salt and liquids. In addition, CAD high prevalence as an HF cause necessitates the intake restriction of saturated fat, cholesterol and simple carbohydrates in these patients' diets.^{26,27} This treatment complexity makes it even more difficult for patients to follow therapeutic plans since the relationship is established between the fact that the greater the complexity the lower the therapeutic adherence.¹⁷

Non-pharmacological treatment in patients with HF is important to maintain stability, avoid hospital readmission and decrease mortality.^{27, 29} Noncompliance rates with this treatment are also high (between 50% and 80%). And among the major limitations for adherence, the lack of knowledge and of an association between what patients with HF know that must be done and

results from a certain behavior. That is, they understand that a low salt diet is important but they do not always relate excess salt in the diet to water retention and weight gain, which can lead to clinical decompensation and consequent hospital readmission.^{26,30}

Forgetfulness is an important barrier to adherence and there is a significant association between HF and cognitive dysfunction, which is prevalent among the elderly.^{26, 30} In general, advanced age favors low adherence to treatments, either due to the presence of several chronic diseases or diminution of cognitive and functional capacities.²²

A randomized clinical trial²⁸ called *Home based intervention Led by Nurse in Brazil* (HELEN-I) has verified the effect of an educational nursing intervention resulting from a combination of home visit and telephone contact in patients with recent hospitalization for decompensated HF, knowledge of the disease, self-care skills and adherence to treatment, compared to conventional patient follow-up, in a period of six months. Two hundred patients were randomized, with significant improvement in knowledge and self-care for the intervention group. To assess knowledge about HF, a questionnaire consisting of 14 questions was applied. And to measure abilities for self-care, the *European Heart Failure Self Care Behaviour Scale* (EHFScBS) was used, consisting of 12 questions. Both instruments are validated for use in Brazil.^{31,32} Adherence to treatment was measured in the end between the groups by a questionnaire also validated and consisting of ten questions. Questions include one on medication use, one on weight management, three on eating habits, three on drinking liquids, one on drinking alcohol and one on attending appointments scheduled. The hit score ranges from 0 to 26 points. The higher the score, the higher the adherence. Adherence was considered appropriate when the patient reached a score of 18 points, which corresponded to 70%. In this study, adherence was significantly higher in the intervention group, which received home visits and telephone contact to reinforce guidelines. There is still no consensus on a pattern constituting an adequate rate of adherence for the treatment of chronic diseases. However, some studies, focusing on pharmacological treatment, suggest that rates around 80% are acceptable.¹⁸

The same questionnaire mentioned above was used to assess adherence to treatment in a cross-sectional study²⁹ conducted in two outpatient clinics for patients with chronic HF, located in the South (Porto Alegre) and Southeast (Niterói) regions of Brazil. This study has analyzed adherence to HF treatment in 340 patients followed up by a nursing team and its association with their characteristics, such as number of previous consultations, family structure and comorbidities. Mean adherence score was 16 (\pm 4) points and only 124 (36.5%) had compliance rate \geq 70%. In addition, patients living with their families were shown to have higher adherence scores and three or more previous nursing appointments were significantly associated with higher adherence. Presence of hypertension as a comorbidity was related to low adherence to treatment.

Another instrument that can be used to assist in the development of education and treatment strategies in patients with HF is the *Dietary Sodium Restriction Questionnaire* (DSRQ), which aims to identify factors affecting adherence to dietary sodium restriction for these patients. A cross-cultural adaptation to Brazil of this questionnaire, with subsequent validation, was carried out by d'Almeida et al.^{33,34}

Understanding basic health information is critical to making lifestyle changes and, according to Alves et al.,²⁷ would be the initial step to improve patients' adherence to dietary treatment, which could be focused on increasing awareness of what is considered healthy eating. Knowledge about disease treatment has also been evaluated as a predictor of dietary adherence.³⁵ And although it is something rational and adherence a complex process encompassing several biosocial and emotional factors, with which Jesus et al.,⁹ agree, it should be considered in the context of treatment adherence. It is important to emphasize that taking knowledge to people is important but the relation between knowing what is needed and doing it is fragile since knowledge does not instigate change. But when individuals are encouraged, they wish to change and it can function as an instrument of change, which is the first step in a healthy behavior.^{1,21}

A methodological study³⁶ has carried out some cross-cultural adaptation and validation for use in Brazil of a questionnaire to know cardiovascular risk factors (Q-FARCS), change in lifestyle and adherence in a sample of patients with CAD. The questionnaire is divided into three scores: general knowledge of risk factors, specific knowledge and lifestyle changes. Since knowledge can correlate with patient behavior in relation to some risk factors, determining its degree can be useful in decision-making regarding the intensity of interventions and individual patient orientation. Therefore, tools measuring knowledge as a means of assessing adherence may also be useful in seeking to increase adherence to guidelines proposed.

Adherence to treatment by hypertensives alone is considered low. And when associated with HF it decreases even more, since the number of medications increases, as well as treatment costs and lifestyle restrictions increase.²⁹ With regard to arterial hypertension, there are several instruments to measure adherence to treatment, such as *Cuestionario de valoración del comportamiento de adherencia al tratamiento farmacológico y no farmacológico*, the MBG (Martín-Bayarre-Grau) questionnaire and *Hill-Bone compliance to high blood pressure therapy scale*, among others. These questionnaires measure different adherence-related constructs but many are validated only in Spanish and English and most focus on drug treatment.⁶

In contrast to the above, the “adherence questionnaire to the treatment of systemic arterial hypertension” (QATHAS), developed and validated in Brazil by Rodrigues et al.,³ which has sought to evaluate adherence to pharmacological and non-pharmacological treatments. QATHAS has 12 questions, of which five are about pharmacological treatment (medication use, medication dose,

medication schedule, symptom, drug treatment routine), four on eating habits (salt and fat use and white meat, sweets and sugary drinks consumption), one about physical exercise, one about non-drug treatment and one about attendance at scheduled appointments. By responding to QATHAS, unlike the other questionnaires, the result is not obtained by adding points or scores, but by a mathematical formula, which determines the adherence level in which each respondent is situated, which ranges from 60 to 110, that is, hypertensive patients with lower adherence reach 60, while the most adherents are at level 110.

Figueiredo & Asakura¹⁰ have investigated, by a descriptive cross-sectional study, hypertensive patients' main difficulties in outpatient follow-up to adhere to treatment proposed by a health team. Fifty-four individuals were interviewed with a preestablished script containing open and closed questions about sociodemographic characteristics, lifestyle and treatment for hypertension and what they knew about the disease. The main difficulty reported in the treatment was the adoption of a low salt diet because they did not like the taste or because they received their food with salt prepared by another person, followed by regular physical activity for reasons such as pain, lack of company and time. Regarding drug treatment, the main difficulty was to remember the time to take the medication. They have also observed an association between knowledge of the disease and follow-up of guidelines received but not between knowledge or follow-up of guidelines with blood pressure control, demonstrating that, as in the study by Ribeiro et al.,³⁷ knowledge about the disease does not necessarily imply behavior change and, although crucial to patient adherence, alone it is not enough to promote changes necessary to improve adherence to diet,^{17,38} which corroborates findings in the literature.

Diabetes is among the diseases with lower rates of adherence to treatment because it requires different care.³⁹ Educational programs for individuals with this disease have been promoted in order to optimize treatment, where participants are instructed about it in order to obtain autonomy for its control. However, the literature shows that only the information transmitted in the treatment does not ensure patient compliance.⁷ Thus, according to Ferreira & Fernandes,⁷ health professionals have sought to combine knowledge of guidelines with their follow-up.

A systematic review³⁵ of 23 articles on dietary adherence by young people with type 1 diabetes has listed different strategies used in the studies to measure adherence, including 24HR, Food Frequency Questionnaires (FFQ), standardized food records and standardized adherence measures. This review has shown adherence rates to dietary behaviors ranging from 21% to 95%, depending on the specific behavior studied and the type of diet prescribed, more flexible or not in relation to carbohydrate control.

Davison et al.¹³ have assessed the relationship of adherence to diet, glycemic control and cardiovascular risk factors in 3180 Brazilian patients with type 1 diabetes. Adherence was defined as compliance of at least 80% of the time to some diet prescribed, reported by the patients by self-

referenced questions related to nutritional factors included in a questionnaire applied during an outpatient clinic visit. This study has shown that 54.2% of individuals were adherents to a diet, with better glycemic control, weight and lipid profile of the patients who reported adherence when compared to those who were not adherent. In addition, adherents reported less difficulty following a diet. The most frequent difficulties reported were in relation to the amount of food and fractionation of the prescribed diet, followed by avoiding sugar and sweets, understanding the list of food substitutions and eating vegetables and fruits.

Nascimento et al.³⁹ have verified adherence to nutritional therapy as a form of treatment in 34 diabetic patients, adults and elderly, hospitalized in a public hospital in Curitiba, by the application of a questionnaire including questions about nutritional therapy in a subjective way, directed to themselves, whether or not they approached the follow-up of dietary planning and who had complied to the prescription. Of the total, 58.8% of the patients stated that they had had nutritional therapy as a form of treatment. However, most of them did not have a dietary prescription by a qualified professional, in this case, the nutritionist. And half performed a diet based on the media and popular culture. 41.2% reported not performing any type of food control. Of the patients having a dietary prescription by a health professional, 50% said they would follow all the recommendations. And 50% answered that they would follow it partially. And the most cited difficulty was sweets and pasta consumption reduction. In addition, 90% of the patients who had undergone nutritional therapy with guidance by a health professional reported positive changes after starting the diet. And 100% stated that they would suggest the therapy for other patients. The authors have also observed that the patients would not perform the treatment together. And drug therapy was the most cited one, followed by dietary therapy. Practice of physical activities would be performed only by a small portion, being justified in some cases by the presence of other diseases making exercise difficult.

Assunção & Ursine⁴⁰ have investigated the association between factors such as educational, demographic, socioeconomic, health, disease perception, social support and adherence to non-pharmacological treatment in 164 diabetes mellitus patients assisted by the Brazilian government Family Health Care Program (PSF, in the Portuguese abbreviation) in a district in the Brazilian city of Belo Horizonte. A semi-structured questionnaire was developed to obtain information regarding the variables studied and adherence to treatment was defined by positive answers to both questions: “Do you carry out any regular physical activity?” and “Do you do any kind of food control?” The authors considered partial adherence by a positive answer to one of the questions (regular physical activity or food control) and no adherence by negative answers to both questions. There was a significant association between adherence to non-pharmacological treatment and low income, place of residence, knowledge about complications, motivation with treatment, being part of a group of diabetics and guidelines received from a nurse and a physiotherapist.

Of the instruments used to assess adherence to self-care activities for the diabetic patients, the *Summary of Diabetes Self-Care Activities Questionnaire* (SDSCA) is highlighted, which was translated and culturally adapted to Brazil for Michels et al.,⁴¹ called “Diabetes Self-Management Questionnaire” (DSMQ). DSMQ has six dimensions and 15 assessment items for self-care in diabetes: “General food” (with two items), “specific food” (three items), “physical activity” (two items), “blood glucose monitoring” (two items), “foot care” (three items) and “medication use” (three items, used according to the drug regimen). In addition, it has three other items to evaluate smoking. When assessed with the questionnaire, patients reported how often they performed the activities or behaviors in the previous seven days. Responses range from 0 to 7, with scores indicating the level of adherence to self-care activities. In the instrument, zero represents the least desirable situation and seven the most desirable one, except in the specific diet dimension, where values are reversed. Although the questionnaire application is easy, practical and quick, as with every instrument DSMQ presents limitations, such as items representing broad concepts that may be difficult to evaluate or interpret, for example, “Follow a healthy diet.” However, its application may help in better adherence, as it reminds patients about essential care in their treatment.

It is still difficult to trace non-adherent patients’ profile.³⁰ However, individuals’ personal factors also have a negative effect on adherence, such as lack of motivation for lifestyle modification, lack of knowledge about the disease both by caregivers and patients themselves, low self-esteem or depression, lack of family support, personal problems, a high number of diseases associated, absence of symptoms, stress, negative representations regarding the disease and treatment, as well as patient passivity in relation to health professionals and the choice of therapeutic regimen.^{8,11,17,19,21,22,40}

Among the adherence facilitating factors are: flexible treatment, longer diagnosis time, simplification of prescriptions and clear goals, focusing on gradual changes, social and family support, patient education, feeling of well-being, greater number of consultations.^{4,8,9,24,27}

Families may play an ambivalent role in relation to dietary changes, for while at the same time making it difficult to change behavior by resistance to modifications, it is an active and integral part of change, encouraging and motivating patients.^{5,30} Therefore, proposals for dietary changes must take into account the family and social environment, since the practices related to food are determined and influenced in that conviviality and factors included in this context are related to adherence.^{8,19}

This is agreed upon by Maffaccioli & Lopes, as cited by Franzoni et al.,⁴² in terms that resisting change is a process that is naturally present in human relationships. Motivation for change is affected by various conditions external to the patient. And individuals, after being motivated, go through five stages of behavioral change established, described as precontemplation, contemplation, preparation for action, action and maintenance. It is understood from this model, called the

Transtheoretical Model, that individuals are ready to effect some change only when they reach the fourth stage, which would be the moment in which they actively start to change a habit.^{42,43} Investigation of dietary behaviors by identification of motivational stages makes it possible to increase nutritional interventions effectiveness, since to the extent that the determinants of the dietary behavior are better known, the chances of therapy success increase.⁴³

Frazoni et al.⁴² have shown that motivation is essential to enable changes in habits by an experimental study of a qualitative nature aimed to evaluate whether nutritional intervention in a group modifies eating habits. However, it is noted in this study that improvement in eating habits change during the intervention (weekly meetings in a period of one month), identified through the questionnaire “How is your food intake going on?” from Brazilian Ministry of Health, has not been consolidated after the end of the group intervention, which indicates the need to maintain health care education.

Something similar can be found in the study by Schultz et al.¹⁴ with women with risk factors for metabolic syndrome, who demonstrated that short-term educational intervention with individualized nutritional care and biweekly educational workshops for four months was effective in encouraging diet qualitative change. However, a trend of abandonment of recommended eating habits throughout the intervention was observed in a six-month evaluation, emphasizing the need for periodic maintenance interventions.

Adherence is a large and complex challenge to public health involving a multidimensional behavioral process influenced by several factors, such as individuals themselves, health status, therapy, socioeconomic aspects, the health care system and relationship with health professionals, encompassing biological, psychological, socioeconomic and cultural dimensions.^{1,37,44} Adherence to non-pharmacological treatment appears to be more difficult.^{8,10} Adherence to nutritional guidelines is often lower than adherence to pharmacological treatment, which seems to improve when patients receive guidance from a multidisciplinary team.^{8,27}

Adherence to intervention programs aimed at promoting lifestyle changes in obese patients is also low.⁴ The majority of obese people have inadequate habits that lead to the development of this disease and, according to Golay, cited by Rodríguez et al.,²⁴ 90% of people trying to lose weight, fail. Thus, for Rodríguez et al.,²⁴ changes should be made only gradually in food or food groups that are being inadequately consumed, which could facilitate adherence to the diet proposed. Also, Alves et al.,²⁷ in agreement with Rodríguez et al.,²⁴ state that nutritional guidance should be preferentially individualized, with some diet specific to patients’ physiological and behavioral profiles, thus being more likely to succeed, taking into account the complexity of treating a certain disease. Which is corroborated by Lustosa et al.¹⁸ when they mention that treating all patients with the same disease in the same way contributes to lower adherence to treatment.

Moreira et al.⁴⁵ would evaluate, in a descriptive and quantitative cross-sectional study, the anthropometric and nutritional evolution, observing weight reduction and abdominal circumference and change in dietary pattern for 78 obese patients of both genders in a nutritional group care, followed biweekly for six months. Among the 78 patients referred for group care, 59 attended the first meeting and only 40 reached the end of the program. The authors suggest that the dropout rate found in the study may have been due to the fact that the participants were not in a favorable stage of behavior change and therefore would not be prepared or motivated for action, change of habits and, consequently, for weight reduction. Based on this perspective, they also emphasize the importance of the psychological approach to reaffirm treatment goals for weight loss and to motivate patients. Despite the dropout rate, the program proposed proved to be very effective for weight reduction and food reeducation.

Vivas et al.⁴ have identified predictive variables of low adherence to a pilot lifestyle modification program based on a balanced hypocaloric diet, exercise promotion, and psychological support directed at overweight individuals in primary health care. Low adherence to the program was considered when individuals' participation was less than 80% of fortnightly meetings. At the end of the intervention, 55% of participants had low adherence and self-reported causes of non-adherence or discontinuation of treatment were: vacation, work problems, lack of motivation and family problems. Variables identified as predictors of low adherence were related to having a Body Mass Index (BMI) ≥ 35 kg/m², having stopped smoking in a period ≤ 4 months, performing a hypercaloric diet and maintaining a sedentary lifestyle. The study results may be related to lack of awareness of obese individuals lacking "health complications" about the disease risks for their health.

It is important to remember that patients are not the only ones responsible for the treatment, since, as previously explained, several factors interfere in the therapeutic process, contributing to non adherence, such as values, beliefs, aspects related to health services and professional-patient relationship.^{5,9,18,20}

Studies reveal obese patients' disappointment for having to treat the disease in primary care due to lack of time, experience and low advice received by professionals. Some authors suggest that primary health care professionals show negative attitudes and disinterest in treating obese individuals.⁴ However, it is important to emphasize the professionals' stress due to the daily work overload and the low financial remuneration, which are factors influencing this type of behavior.^{4,18}

Adherence to treatment is a behavioral change in search of a healthy lifestyle, which includes changes in eating habits that are often interpreted as something unpleasant and difficult to perform.^{24,39} Several factors contribute to people believing that dieting is the most difficult part

of the treatment to be carried out, which further influences low adherence, such as inflexible dietary plans that do not take into account patients' personal aspects and the restrictive view that patients have about eating plans.^{8,39} Nothing should be prohibited, provided that the preestablished quantities are complied to.¹ Above all, eating patterns are involved in emotional and cultural issues. Therefore, it is often difficult to modify them.³⁹ Awareness of the need to adhere to a dietary treatment is very important but attention should be paid to patients' habits and beliefs. Nutritional intervention shall be more successful if the educational proposal is centered on patients' beliefs, customs and concerns about treatments.^{39,44} The concept of dietary change is closely linked to the idea of a progressive process, which requires flexibility on the part of professionals, which occurs slowly and gradually, and may lead to setbacks that depend on events in patients' lives, such as losses, family problems, drastic routine changes etc.⁸

Strategies in nutritional care that encourage motivating the individuals could improve adherence to treatment as well as their empowerment so that they can become able to identify barriers to self-control and thus overcome them, becoming apt to care for their well-being.^{7,16,19} The establishment of realistic goals, social and family support, as well as a therapeutic alliance allowing individuals to participate in solving problems related to food, are strategies aiming to reduce the dropouts inherent in conventional treatment.¹⁹

The effort to abandon entrenched habits can arouse feelings of ambivalence and health professionals' training lacks information about the area of communication and listening to human beings' subjectivity, which would facilitate the professionals' work and the patient's understanding of the guidelines.^{18,42} Constructing a professional-patient link with better communication and guidelines easier to be understood, both in individual and collective consultations, is a therapeutic resource that favors adherence.^{10, 42} Professionals should also be attentive to the degree of understanding that the patient had about the guidance provided, being able to identify possible distortions in what was advised.

The word diet, for example, commonly used by professionals, brings a connotation of restriction and can be substituted at the moment of guidance by healthy diet or food plan, emphasizing that, if it is the case, the proposed healthy diet is one that should be adopted by all people in general, preventing future complications for all.⁸ In this sense, nutritionists' importance in nutritional education actions is highlighted, since there are difficulties on the part of other health professionals in carrying out educational and nutritional instruction activities, because they do not have adequate training for this function.²¹

Another strategy to improve adherence is some multiprofessional and interdisciplinary work with a broad health team in order to find viable alternatives to the difficulties reported by patients and their families.^{10,11,21} A multiprofessional approach allows patients to have an adequate understanding

of their condition, since nonmedical professionals often provide the same information in different ways, facilitating patients' understanding of the importance of treating the disease.^{18,27}

The non-adherence approach should also be considered by governments and educational institutions. In health services, there is some need for ongoing education of professionals working in the Brazilian government Unified Health System (SUS, in the Portuguese abbreviation) system in order to develop preventive and health promotion actions as expected. There is also need to revise the budget for health, as well as more active and humanized attitudes in public health proposals at all levels and at all spheres of government.¹⁸ It is important to emphasize that factors related to the health institution also influence adherence, such as access to health service, health policies and waiting time for care.¹

In many countries adherence to diet is a difficult goal to achieve.¹⁷ García-Meseguer et al.,⁴⁶ in their cross-sectional study, have characterized dietary habits and evaluated the quality of diets and some possible determinants of students at a Spanish university, according to the Mediterranean diet standard, among other indexes. For each student (n = 284), a self-report questionnaire was submitted involving anthropometric measures, housing types, smoking habits and physical activity levels. Food consumption was collected through two non-consecutive 24HR, including a weekend day. The diet quality was assessed through the *Healthy Eating Index* (HEI) and the Mediterranean Diet Score (MDS), which revealed low-intermediate scores in both. According to the HEI classification, 96.1% of the subjects scored "poor" or "in need of improvement" on the quality of their diet and only 5.3% of the students achieved a high adherence to the Mediterranean diet.

In another direction, Torrado et al.,⁴⁷ in a longitudinal study carried out in Madrid with 99 obese adults submitted to a weight reduction program, have aimed to know the individuals' emotional behavior to facilitate the establishment of personalized nutritional guidelines based on healthy eating habits and increase patients' fidelity until reaching the desired weight. Adherence to the Mediterranean dietary pattern and the effect of emotions on food choices were determined with the application of the questionnaires MEDAS (*Mediterranean Diet Adherence Screener*) and EEQ (*Emotional Eater Questionnaire*), respectively. The population studied had unhealthy lifestyles and their eating behaviors were dependent on emotions. The majority of participants (66% of women and 71% of men) were classified as emotional eaters. During the treatment program, participants changed their eating and lifestyle habits, achieving body weight reduction in at least 10% of the initial weight.

This study emphasizes the need to take into account the patients' feelings about food so that an individualized strategy can be developed for each individual according to their possibilities, in order to overcome the barriers preventing them from following the guidelines proposed.

An observational cohort study⁴⁸ in Australia has found that high-quality diet is associated with improved quality of life and functional capacity in older adults (≥ 55 years). 1,305 and 895 participants with complete data after five and ten years have been analyzed, respectively. Dietary data were collected using a self-administered semiquantitative FFQ, containing 145 food items and nine frequency categories to indicate the usual regularity of food items consumed in the last year. Total diet scores were calculated for the intake of food and nutrient groups, reflecting adherence to dietary guidelines, according to the *Australian Guide to Healthy Eating*. Higher scores indicated greater adherence to nutritional guidelines.

Diet scores can serve as useful tools for assessing population adherence to a diet and for studying the health benefits of a given dietary pattern.⁴⁶ And several studies have used these scores, such as the Mediterranean Diet Score (MDS) or the DASH (*Dietary Approaches to Stop Hypertension*) Score.⁴⁹⁻⁵⁴ These indices evaluate the quality of individual and population diets in terms of compliance with dietary guidance^{46,55} and among the main ones is HEI, developed according to American dietary guidelines. Some studies have adapted HEI to the Brazilian population. The indexes usually consist of groups of foods and nutrients and to determine the food standards it is necessary to know their construction and punctuation. They can also be used in determining more efficient strategies and nutritional interventions, aiding in nutritional education programs.⁵⁵ However, like any food analysis tool, it presents advantages and limitations, since representing the human eating behavior dimension is complex, requiring not only the use of adequate techniques but interpersonal skills by the interviewer so that individuals report in the best way possible what they consume.⁵⁵

With regard to lung diseases, therapeutic adherence is also low.⁵⁶ Cystic fibrosis (CF), for example, requires patient adherence to a complex self-care treatment that fills a considerable portion of their daily lives. Dalcin et al.²⁵ have studied the self-reported adherence of 38 patients attended by a program of adults with CF in a prospective, cross-sectional study, establishing associations with the disease clinical characteristics and patients' compliance perception by the multidisciplinary team. The degree of adherence was assessed by an adapted questionnaire in which two forms of questionnaires were developed: one addressed to the professionals in the multidisciplinary team and another to patients. The two forms of questionnaires addressed seven of the main therapeutic recommendations for management of the disease, such as respiratory physiotherapy, hypercaloric diet and pancreatic enzymes. And in each question the use weekly frequency of the therapeutic modality considered should be indicated. There was evidence of high self-reported adherence to most of the therapeutic recommendations. However, two recommendations had very low compliance: diet and physical activity. The self-reported adherence score correlated inversely

with the clinical score, suggesting that more severe patients adhere more to the treatment. And, in general, self-reported adherence by patients was greater than that perceived by the health team.

Evaluation of adherence is not only a matter of measuring compliance with professionals' recommendations but also, even in a limited perspective, checking factors that make it difficult to incorporate certain attitudes necessary for therapies. Above all, in the adherence process patients have autonomy to accept or not recommendations and should be, as explained above, active participants in treatments.⁸

In order to create solutions for promoting adherence, it is essential to identify the obstacles impeding adherence, the patients' difficulties in relation to treatment and what types of behavior could make it possible to follow the recommendations.^{10,57} In addition, this identification may also enable the recognition of the groups that are most vulnerable to non-adherence, contributing to the adoption of actions targeting them.¹⁸

A multistate study⁵⁷ carried out in six sites in the United States has aimed to understand barriers and facilitators for adherence to *Dietary Guidelines for Americans* for four food groups (milk, whole grains, fruits and vegetables) in fifth graders and adult caregivers. Barriers identified for adult caregivers were: lack of skills for meal preparation or recipes, difficulty in changing eating habits, cost, lack of knowledge of the recommendation/portion/health benefits and taste. For children, central barriers were: competing foods (foods high in calories but with reduced levels of nutrients), health concerns (such as milk allergy/stomach pain), taste/aroma/smell, forgetting to eat them and difficulty consuming or figuring out the recommended amount. The authors suggest that interventions could target specific barriers in order to change consumption of a particular food group instead of focusing on eating behaviors in general, which is in line with what was proposed by Rodríguez et al.²⁴ that changes be made only in food groups that are being improperly consumed.

Socioeconomic factors are also determinant for lack of adherence, since the lower these levels, the lower the adherence rates, possibly due to less knowledge of the disease and more difficult access to health services.¹⁸ However, it was observed that in a large part of the studies analyzed in the present study no associations were found between adherence and sociodemographic characteristics or knowledge about the disease, which may have been influenced by the relatively small sample size in some studies, by the various research delineations and by the diversity of locations in which they were carried out.

Conclusion

There are several interfaces that can influence adherence to treatment such as lack of motivation for lifestyle modification, lack of knowledge about the disease, low self-esteem or depression, lack of family and social support, personal problems, the high number of diseases associated, absence of symptoms, stress, negative representations regarding diseases and treatments, relationship with the health team and the health institution, patients' education, feelings of well-being.

Adherence to changing habits is a dynamic process, challenging not only patients but also health professionals who need to develop strategies making it possible to increase adherence. Providing more flexible treatments, with clear objectives, focusing on gradual changes, with greater follow-up, in a multiprofessional and interdisciplinary work, may allow greater adherence to treatments.

Avoiding prescriptions that are too restrictive and incompatible with the lifestyle of some patients is one of the first steps to improve adherence to nutritional guidelines, which is related to recognition, acceptance and adaptation of the new health condition by individuals, in addition to the development of self-care to seek healthier habits. The lower the complexity, the greater the therapeutic adherence.

Based on this perspective, the existence of validated instruments that can measure and evaluate the individuals' behavior beyond empirical data management that is obtained by simple observation is important for application in research and to guide professionals in their conduct, allowing a certain precision about this subjective data.

Due to the complexity of the adherence issue dimension, there is no method or instrument suiting all objectives and research. However, methodological studies are needed to develop and validate instruments for assessing adherence to nutritional guidelines, as well as treatments as a whole, since there are instruments aiming to measure treatments in a general way but placing more emphasis on pharmacological treatments.

Contributors

Estrela KCA has worked in all stages of the study, from conception to revision of the final version of the article; Alves ACC has participated in all stages of the study, from conception to revision of the final version of the article; Gomes TT has participated in the revision of the final version of the article; Isosaki M has participated in the writing of the article and its final version.

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