Artículo Original

Assessment of nutrition literacy by two diagnostic methods in a Brazilian sample

Avaliação do letramento em nutrição por dois métodos diagnósticos em brasileiros

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ABSTRACT

The nutrition literacy is defined as the degree to which individuals can obtain, process and understand information and basic nutrition needed to make correct decisions. The aim of this study was to evaluate the nutrition literacy through the use of both instruments. We evaluated 38 employees of primary health care. The instruments used in the research were: Newest Vital Sign - NVS and Nutritional Literacy Scale - NLS. This is a sample of adult with undergraduate, 81.6% women, with associated post graduate, 52.6%. The prevalence of inadequacy was 68.4% and 5.3% for NVS and NLS, respectively. There was no agreement between the methods of assessment of literacy in nutrition (k = 0.50, p = 0.324). It follows that the two instruments are not interchangeable for use with the purpose of diagnosing nutritional literacy.

KEYWORDS

Health Literacy; Information Literacy; Nutrition.

RESUMO

O letramento em nutrição é definido como o grau em que indivíduos podem obter, processar e entender informações e serviços básicos em nutrição, necessários para tomar decisões corretas. O objetivo do estudo foi avaliar o letramento em nutrição mediante a utilização dos dois instrumentos. Foram avaliados 38 funcionários do serviço da atenção básica. Os instrumentos utilizados na pesquisa foram: *Newest Vital Sign* - NVS e o *Nutritional Literacy Scale* – NLS. Trata-se de uma amostra de adultos graduados na área da saúde, 81,6% de mulheres, com pós-graduação associada, 52,6%. A prevalência de inadequação foi 68,4% e 5,3% para NVS e NLS, respectivamente. Não foi observado concordância entre os métodos de avaliação do letramento em nutrição (k=0,50; p=0,324). Conclui-se que os dois instrumentos não são intercambiáveis para aplicação com o propósito de diagnosticar letramento nutricional.

PALAVRAS CHAVE

Alfabetização em Saúde; Competência em Informação; Nutrição.

INTRODUCTION

Transformations related to the growing modernization and urbanization that occurred in several countries

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worldwide, like Brazil, are associated with changes in lifestyle and eating habits of the population, and these changes have contributed for the development of non communicable disease[1,2].

In Brazil, still can say that there is not an aggressive nutrition policy capable to change this situation, but the first steps have been dated since 2004, with the release of the Food Guide for the Brazilian Population[3], one of the instruments built under the guidelines of the National Food and Nutrition Policy of Ministry of Health. The mentioned Guide has a pocket version to the population, for the purpose of teach them how to eat better.

However, it is necessary to discuss about what from educational healthcare instruments are properly understood and interpreted by the population to which it is intended. Such understanding is beyond of ability to read, but reaches the concept of health literacy, sometimes considered of literacy in health.

There is no consensus in the literature about the definition of *Health literacy*. Most of the studies connect the concept in question to others as: health promotion, education, empowerment and education and adult literacy in Freire's perspective[1-8]. However, although there are conceptual variations, different speeches establish among themselves certain closeness, because they focus on the individual's ability to understand, evaluate and use information for making health related decision, which consequently leads to an improvement and/or reducing health inequities.

There are several instruments to measure the degree of health literacy in the population, most notably the Rapid Estimate of Adult Literacy in Medicine - REALM[9] and the Test of Functional Health Literacy in Adults – TOFHLA[10]. However, both Rogers et al.[11] as Baker[12] consider that none of these tests are comprehensive enough to accurately measure the ability, remaining still emerge a fully appropriate instrument.

Stimulating even further the debate, there is a specific conceptual and operational gap associated with nutritional literacy. According to Silk et al.[13], this is defined as the degree to which individuals can obtain, process and understand information and basic services in nutrition required to make correct decisions about this. There are two instruments that have been used in order to measure this ability. One is specific, developed by Diamond[14], the *Nutritional Literacy Scale* – NLS and the other can be applied either for the purpose of

assessing health literacy, such as nutrition[15], which is the *Newest Vital Sign* – NVS, developed by Weiss et al[16].

Given the above, this study aimed to assess nutrition literacy through the use of two instruments, evaluating their agreement and providing a critical reflection on their applicability in practice of daily attendance.

METHODS

It is a cross-sectional, descriptive and analytical study, realized in November and December of 2010 in Fortaleza (Ceara-Brazil), belonging of the research "AlfaNutri Plan: a new paradigm, nutritional literacy, to promote healthy eating and regular physical activity in the prevention and control of chronic diseases". The study was outlined according by the Resolution 196/1996[17] which regulates human research and was approved by the Ethics Committee of Research, charge of the study (Process number: 08628438-0).

The study was conducted with all health employees (38) of primary health care institution which agreed to participate in the survey through a signature of free and informed consent form. They were selected by convenience, with non probabilistic approach. This is about an adult population, consisting of 31 (81.6%) women and 7 (18.4%) men with a mean age of 38.3 years and standard deviation of 10.1 years. Most employees have undergraduate in health (dentist and medical doctor) with post graduate associated (52.6%).

The involved variables in this study were gender, age, education (through a standardized questionnaire) and literacy in nutrition. The instruments used in the research were: *Newest Vital Sign* - NVS[16] and *Nutritional Literacy Scale* - NLS[14] translated to Portuguese. The authors[14,16] did not provided maximum time of application, however, there was an average duration of 6 minutes for the NVS and 12 minutes to the NLS in our study. They were applied one after the other randomly, without breaks between them, by trained researchers with expertise in those instruments.

The NVS consists of a nutritional label of ice cream where the interviewed answers about questions associated with to the content of such label in a total of six questions. This allows to measure understanding of assessed on the ability of use of numbers and mathematical concepts and comprehension of writing. The degree of nutritional literacy is thus categorized: high probability (≥ 50%) of inadequate literacy – 0-1 right question; possibility of inadequate literacy – 2-3 right

questions, adequate literacy − 4-6 right questions. In this study, for analyzes, it were considered two categories: inadequate literacy (0 to 3 questions) and adequate literacy (4 to 6 questions).

The NLS uses the Cloze Procedure, in which one or more words are picked up from a sentence. Each sentence includes four different options, among which the interviewed chooses one that considers the correct. The instrument has 28 questions with subjects as organic foods, calcium, fiber, disease, sugar, among others. The degree of nutritional literacy is categorized as follows: poor (0-7 right questions), marginal (8-14 right questions) and adequate (15-28 right questions). For analyzes of this study it have been considered two categories: inadequate literacy (0 to 14 questions) and adequate literacy (15 to 28 questions).

The data were analyzed using the statistical program SPSS version 16.0, adopting $p < 0.05$ as significance level of the test.

General data were analyzed descriptively using frequencies (absolute and percentage) and parametric measures (mean and standard deviation) and non-parametric (median and interquartile range).

The inferential analysis involved the Kappa coefficient to evaluate agreement between the two instruments (NVS and NLS) and for correlation analysis between the questions of the instruments, Spearman's test was performed. It was also used t Student test to compare the means of quantitative variables and it was observed, before all, Levene test for equality of variances, as well as Kolmogorov-Smirnov test to determine if the variables are well modeled by a normal distribution. For nonparametric variables, the Mann Whitney test for comparison of mean of ranks.

RESULTS

Table 1 shows the distribution of the interviewed according to the diagnosis of nutritional literacy, with median and interquartile range of certain questions in accordance with the NVS instrument. It was observed a prevalence of 68.4% of inadequate literacy.

When comparing the mean of ranks to right questions between men [1.0 (0.0 - 4.0)] and women [2.0 (0.0 - 4.0)] according to the NVS, no difference was observed between genders ($p = 0.626$). A similar result was found when comparing the mean of ranks of correct answers of the group that had undergraduate [1.0 (0.0 - 3.3)] with those who did not have such educational level [2.0 (0.0 − 4.0)] ($p = 0.155$).

Table 2 shows the distribution of the interviewed according to a diagnosis of literacy in nutrition, with mean and standard deviation of right questions in accordance with the NLS instrument. A prevalence of 94.7% of adequate literacy was observed, value higher than the other instrument (NVS).

Table 1. Diagnosis of nutrition literacy in the group assessed. Fortaleza, 2010.

Diagnosis[1]	n	(%)	Median (interquartile ranges)[2]
Inadequate literacy	26	68,4	0,0 (0,0 - 2,0)
Adequate literacy	12	31,6	4,0 (4,0 - 5,8)
Total	38	100,0	1,5 (0,0 - 4,0)

[1] Diagnosis performed by applying the translated version of the Newest Vital Sign (NVS). [2] The results were shown by median and interquartile ranges.

Table 2. Diagnosis of nutrition literacy in the group assessed. Fortaleza, 2010.

Diagnosis [1]	n	(%)	Mean (SD)[2]
Inadequate literacy	2	5,3	13,5 (0,7)
Adequate literacy	36	94,7	23,2 (3,3)
Total	38	100,0	22,7 (3,9)

[1] Diagnosis performed by applying the translated version of the Nutritional Literacy Scale (NLS). [2] The results were shown by mean and standard deviation (SD).

The average right answers of the group with complete undergraduate was 24.1 (2.7) questions, while individuals with lower schooling was 21.2 (4.5) questions. Unlike observed in NVS, there was statistical difference (p = 0.019) between the two levels of schooling. When comparing the averages of right questions between the NLS men [21.4 (4.9)] and women [23.0 (3.7)], no statistical difference between groups (p = 0.346) was observed.

There was no correlation between the diagnoses of literacy in nutrition shown on both instruments (r = 0.298, p = 0.069). Also was not found concordance between the assessment methods of literacy in nutrition (k = 0.50, p = 0.324).

DISCUSSION

This is the first study to evaluate the applicability of the NLS and the NVS in Brazil. The issue of literacy in health and/or nutrition is still not too much debated in the country. There are only eight articles available from among the indexed literature, all with exclusive focus on health literacy[18-25].

The results showed that the two instruments are not interchangeable for use with the purpose of diagnosing nutritional literacy, since there was a performance difference. Furthermore, there was no interference of gender and education in the performance of the NVS, but to the NLS the most schooling led to better performance.

Choosing the best measurement instrument it is a challenge that probably goes through the evaluated clientele and by the purpose to be achieved with your application. The NVS is a shorter instrument and therefore takes less time to be applied. On the other hand, their content is more directed to the research with numeracy skills because to settle the question, the answerer needs to do some mathematical operations of addition and multiplication.

In the NLS, there is a possibility of better performance is associated with the fact that there are gap sentences where answerer can identify the word omitted from a list of options, even if they do not fully understand their meaning.

Referring to the potential application of NVS, Welch et al. [26] evaluated the cost, time and clinical application of NVS in basic care in Atlanta in 2008, in which all patients (n = 5544) completed this instrument as part of the routine admission. These authors considered that the time and cost restrictions associated with the implementation of NVS on the screening were modest. The average application time was less than 2 minutes in this study. Thinking in reality of attendance the Unified Health System (SUS) of Brazil, it looks quick and easy the application of instrument, with the advantage to be useful to measure both health literacy as nutrition literacy[15]. On the other hand, the participants of this study had good education and yet not performed well, leading to hypothesize that worse may yet be such performance in SUS users which, in most cases, probably will not have many years of study. However, the discussion that should be done is not about hit or not most questions. Should be if the instrument assesses, with trustworthiness, the understanding of the information the of respondents. In the present study, in case of recommendation of the instrument, stays the interpretation that the nutritional literacy group assessed is not suitable, can be leading to the misinterpretation of information and instructions on health.

Welch et al. [26] also evaluated the attitude of health professionals to the use of the instrument. Most of them reported inability to correctly identify individuals with health literacy/nutrition limited, without the use of the same. These professionals also mostly (66.7%) gave to the use of NVS an improvement in quality of care so helping to personalize communication with patients.

One of the issues raised in the literature on the application of instruments to assess literacy refers to the embarrassment that it may cause to the user of the health service[27,28]. However, VanGeest et al.[29] evaluated the difficulties in applying the NVS in 179 people who attended a primary care clinic. They found that 100% of patients reported not feel embarrassed to answer the instrument and 97% were favorable to the application of NVS in clinical triage. Even the patients with the lowest levels of literacy also felt both comfortable and with strong support for application in clinical routine.

The identification of inadequate literacy in nutrition before starting the attendance can direct all the approach, allowing selection of the most appropriate words and terms and of easy understanding, as the choice of verbal directions and writing more easily assimilated[26]. In this way, the new procedures adopted may be associated with better adhesion to guidelines and therefore to the best results in the management of health conditions.

Really, it was found an association between mortality and literacy in health, diagnosed by NVS (p <0.01), in a study conducted in a primary care clinic with 103 adults in Quebec, Canada[30].

The NVS was also used in the Netherlands, 201 patients with coronary artery disease and 88 with type 2 diabetes[31]. These patients had great difficulty in answering it, both by not to be familiar with food labels, as by the calculation of portions and grams required. In the same study, more than half of patients (56%) answered one or none question.

In nutrition, basic math skills are necessary because the understanding of the nutritional recommendations, food servings, labels, among others are intrinsically related to such skills. In this perspective, the NVS is applicable, as it encompasses investigation of ability of reader and of numeracy, which no longer occurs with the NLS, which clings mainly to the investigation of reading skills.

The NLS is still few used, being originally applied[14] in 341 patients of both genders, divided into groups according to treatment in four sectors of an American hospital, nutritional literacy was also considered satisfactory for most interviewees, with a mean of 23.7 (4.1) scores.

Several discussions can be made from the findings concerning the application of NLS. The instrument investigates different issues linked to nutrition, which, to a greater or lesser extent, are often focused on educative activities that promote health. In case of has not be observed the specific performance by question, the test may be describing a reality of good nutritional literacy, but can also be overestimating the understanding. It would be important to know the content of nutritional education in which the group has already been exposed in order to get away the influence from them on observed performance.

In the NLS[14], the author does not set time limits for their application, but this is not as fast as the NVS, in that it includes 28 questions. The instrument was fully built with questions of gap sentences, following an adaptation of the Cloze Test. This procedure is discussed by Martins and Filgueiras[32]. The use of these questions can facilitate the hit even that the question has not been, really, well understood.

The major limitation in this study is the sample size. However this does not lose its validity because it is a comparison study of two instruments. We had no intention to assess the prevalence of nutritional literacy in our population, but once tested they are different, this could facilitate future studies of prevalence. Furthermore, it represents an innovation to put the topic under discussion and to test the applicability of these instruments in a Brazilian sample.

CONCLUSION

The two instruments are not interchangeable for use with the purpose of diagnosing nutritional literacy, but the extrapolations of the results should be cautious due to small sample used. A good choice of an instrument of literacy should target the aim of your application and a possible intervention performed later.

The measurement of nutritional literacy is important both to guide educational actions, as for evaluating the impact of educational actions, which have been adapted to existing literacy on health conditions. From this perspective, it is essential the selection of appropriate instruments and at the same time, of quick and easy application in order to facilitate your application in daily routine of care of healthy and sick individuals.

ACKNOWLEDGMENTS

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