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KNOWLEDGE AND INTAKE OF FUNCTIONAL FOODS BY PRIMARY HEALTH CARE PROFESSIONALS FROM A LEGAL AMAZON REGION, BRAZIL

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ABSTRACT

Knowledge and intake of functional foods by primary health care professionals from a legal amazon region, Brazil

Backgroud: In order to counteract the incidence of chronic non-transmissible diseases the adoption of healthy food choices and functional foods are essencial. Objective: to evaluated knowledge and intake of functional foods by health professionals. Subjects and Methods: 45 health professionals (60% of the total) from the primary health care system from middle Araguaia, Legal Amazon, were studied. Dietary questionnaire evaluated knowledge of nutrition, food frequency, and intake frequency of functional foods. Results: The majority of people (64%) known the concept of functional foods. Functional foods with adequate dietary weekly intake was garlic, coffee, onions, and the common beans. The dietary intake of tomatoes and its products was 49% at least five days a week. Dietary intake of apples, cabagge, cheese and dairy products, grapes and grape juices was considerable, but insufficient. Considering Brazilian and regional foods, the dietary intake was considerable but unsatisfactory for bananas (*Musa paradisiaca*), Brazil or Cashew nuts (*Bertholletia excelsa* and *Anacardium occidentale*), “pequi” (*Caryocar brasiliense*), red beet, papaya, orange, and river fishes. The dietary quality of health professionals should be improved by inclusion of both global, national, and regional foods and by reduction on the intake of fats, fatty foods, sweets, fried foods and meats.

Key words: Feeding Behavior. Diet. Nutrition. Chronic Diseases.

RESUMO

Justificativa: a fim de neutralizar a incidência de doenças crônicas não transmissíveis, adoção de escolhas alimentares saudáveis e de alimentos funcionais é fundamental. Objetivo: avaliar o conhecimento e consumo de alimentos funcionais por profissionais de saúde. Sujeitos e Métodos: 45 professionais de saúde (60% do total) da atenção básica do Médio Araguaia, Amazônia Legal, foram estudados. O inquérito alimentar avaliou o conhecimento sobre nutrição, a frequência alimentar e a frequência de ingesta de alimentos funcionais. Resultados: A maioria das pessoas (64%) sabia sobre o conceito de alimentos funcionais. Os alimentos funcionais com ingesta semanal adequada (mínimo de 5 dias por semana) foram o alho, café, cebola e feijão. A ingesta de tomates e seus derivados foi de 49% pelo menos 5 dias por semana. A ingesta alimentar de maçã, couve manteiga, queijo e laticínios, uva e suco de uva foi considerável, mas insuficiente. Considerando os alimentos brasileiros e regionais, a ingesta alimentar foi considerável, mas insatisfatória para bananas (*Musa paradisiaca*), castanha do Brazil ou de caju (*Bertholletia excelsa* e *Anacardium occidentale*), pequi (*Caryocar brasiliense*), beterraba, mamão papaya, laranja e peixes de água doce. A qualidade da dieta dos profissionais de saúde precisa melhorar pela inclusão de alimentos funcionais mundiais, nacionais e regionais bem como pela redução da ingesta de alimentos gordurosos, frituras, doces e carnes.

Palavras-chave: Comportamento Alimentar. Dieta. Nutrição. Doenças Crônicas.

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INTRODUCTION

In the past decades, due to change in traditional food habits and adoption of a Western-type diet the incidence of obesity, metabolic syndrome, and cancer are increasing in Brazilian population (Schmidt and collaborators., 2011). Evaluating a time trend of adult obesity in Brazil, the Midwest region, were Mato Grosso state is located, it has been reported that overweight and obesity increased from 29.9 and 11% (respectively in 2006) to 33.% and 16.5%, respectively in 2013 (Malta and collaborators, 2016).

The National Health Study, covering 60,202 people, showed that almost 40% of Brazilians eat meats with excessive fat content, a quarter of the population regularly drink soft drinks, and 22% of the population regularly eat candy and desserts, both eating habits related to development of chronic non-communicable diseases (Claro and collaborators, 2015).

Despite the fact that nurses know they need to keep the healthy weight and to avoid obesity, they sometimes did not put it in practice (Oliveira and Nogueira, 2010). One of the plausible explanation for that paradox is that food habits and eating behavior are inate or created since the early life or during childhood which difficults its futher change during adulthood (Gahagan, 2012).

Dietary intake of common foods as well as foods with potential health benefits has been studied in order to help reduce diseases' risk (Choi and collaborators, 2015; Ferrari, 2013, 2016; Rostami and collaborators, 2015; Santos and collaborators, 2015; Shatenstein and collaborators, 2003).

Due to a lack of studies regarding knowledge and food habits of health workers, the objective of the current work was to evaluate knowledge and consumption of functional foods among health professsionals in the National Health System (NHS) from three cities of the Midwest, Brazil.

MATERIALS AND METHODS

This descriptive transversal study covered 45 health professionals (60% of the total) of the Brazilian's Public Health System (20 health care unities: 12 family health unities from Barra do Garças, 6 family health unities from Aragarças, 1 family health unity and one health reference center from Pontal do Araguaia) from the Middle Araguaia region, comprising Aragarças (geographic coordinates 15º53'52'' S, 52º15'3'' W), Pontal do Araguaia (15º56'2'' S, 52º19'1'' W) and Barra do Garças (15'53'24'' S, 52º15'25'' W) municipalities.

The subjects comprised 45 health professionals aging between 20 and 60 years old, with a mean of 35.7 ± 11.12 years-old. Other characteristics of the subjects are presented in Table 1.

Health professionals with 18 years or more, of both gender, and interested to engage the study, were included. Exclusion criteria comprised people who did not undestand the questionnaire as well as those who refused to participate the study.

In order to evaluate food knowledge and food habits, a dietary questionnaire regarding knowledge of nutrition, food frequency intake, and frequency of intake of functional foods with regional adaptations and inclusions of typical foods from the middle Araguaia region was used. The instrument was adapted from previously validated food frequency questionnaires (Shatenstein and collaborators, 2003; Vieira and collaborators, 2002). Questionnaires were applied between April and July 2016.

Ethical and statistical aspects

The volunteers signed an informed consent form before entering the study, which was approved by the "Julio Müller University Hospital Ethics Committee" on Research of the Federal University of Mato Grosso (UFMT) (protocol no. 665/CEP-HUJM/09).

Statistical analysis was done by the Epitools® program (Australia). A variance analysis to compared two proportions was performed (ANOVA). Statistical significant differences were considered when $p<0.05$.

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Table 1 - Characterists of the health professionals from Middle Araguaia, Brazil.

Variable	Frequency (n)	(%)
Age (in years)		
20-29	17	38
30-39	15	33
40-49	5	11
50-59	6	13
60	2	5
Education		
Elementary Fund	1	2
Uncomplete high school	2	5
High school	19	42
Undergraduate and/or postgraduate	23	51
Gender		
Female	42	94
Male	3	6
Health profession		
Nurses	17	38
Nursing technitians	26	58
Phsyicians	2	4
Marital status		
Single	27	60
Married	14	31
Divorced	4	9
Drinking alcohol		
Never	22	49
Few days per week	21	47
Everyday	1	2
Did not answer	1	2
Smoking		
Never	40	89
Smoke dew days per week	4	9
Did not answer	1	2

RESULTS

In respect of nutrition knowledge, 68% learned about nutrition in their technical course or undergraduate studies, but 16% did not learn and other 16% did not answered the question. Regarding the knowledge of a relationship between dietary intake of functional foods and non-communicable chronic diseases, 67% afirmed to know it, but 9% and 24% ignored this relationship or did not answered this question, respectively.

Considering the knowledge of functional foods, 18% did not know those foods, and 18% did not give an answer for the question (Figure 1).

The weekly intake of recommended food portions is reported in Figure 2.

The adequate daily intake of fruits, legumes, cereals and milk was low and reached 5%, 18%, 25%, 26%, respectively.

The adequate daily intake of vegetables reached less than 50% of the subjects (44%).

However, daily meat intake was higher, since 26% reported intake by 2 to 4 days and 69% eat meats on a daily basis.

Health professionals had also a higher frequency of consumption of fatty fried foods, since the dietary intake of the categories “2 to 4 days” and “5 to 7 days” reached 42% and 16%, respectively. Similar results were found regarding the intake by “2 to 4 days” and by “5 to 7” days of candies and sweeties (40% and 20%, respectively).

The intake of functional foods and other foods are presented in table 2.

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The functional foods with higher daily dietary intake (e.g. at least 5 days per week) were garlic (Allium sativum) (95%), coffee (Coffea arabica) (67%), onions (Allium cepa) (68%), and the common beans (Phaseolus vulgaris) (78%).

Dietary intake of apples (Malus domestica or M. communis), cabbage (Brassica oleracea), cheese and dairy products, grapes (Vitis labrusca e V. vinifera) and grape juices was considerable, but insufficient considering at least five days per week.

In regard to the Brazilian and regional foods, the dietary intake at least three times per week was considerable for bananas (Musa paradisiaca), nuts (cashew nuts from Anacardium occidentale, Pará/Brazil nuts from Bertholletia excelsa), "pequi" (Caryocar brasiliense), red beet (Beta vulgaris), papaya (Carica papaya), orange (Citris sinensis) and river fishes.

The dietary intake of at least 5 days per week was considerable for tomatoes and its products (49%), milk and cheese (46%), lemon (to marinate foods or as juice) (40%), olive oil (35%), orange (18%), bananas (16%), mate tea (16%), apple (14%), breakfast cereals (13%), brazilian-type bread cheese or milky sweet (13%), soy and its products (11%), seeds (11%), papaya or pumpkin (10%), whereas eggplant, red wine, plum, broccoli, honey, cashew and its juice, guava, grapes and grape juice, river fish, yogurt, chocolate, mango had lower weekly dietary intake.

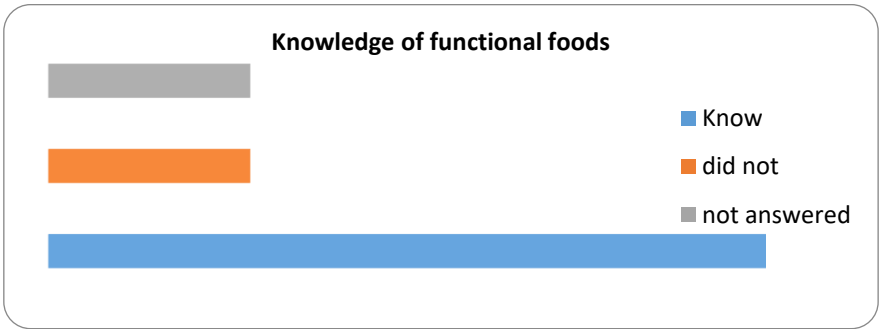

Figure 1 - Knowledge of functional foods by Brazilian health professionals of the Middle Araguaia, Legal Amazon.

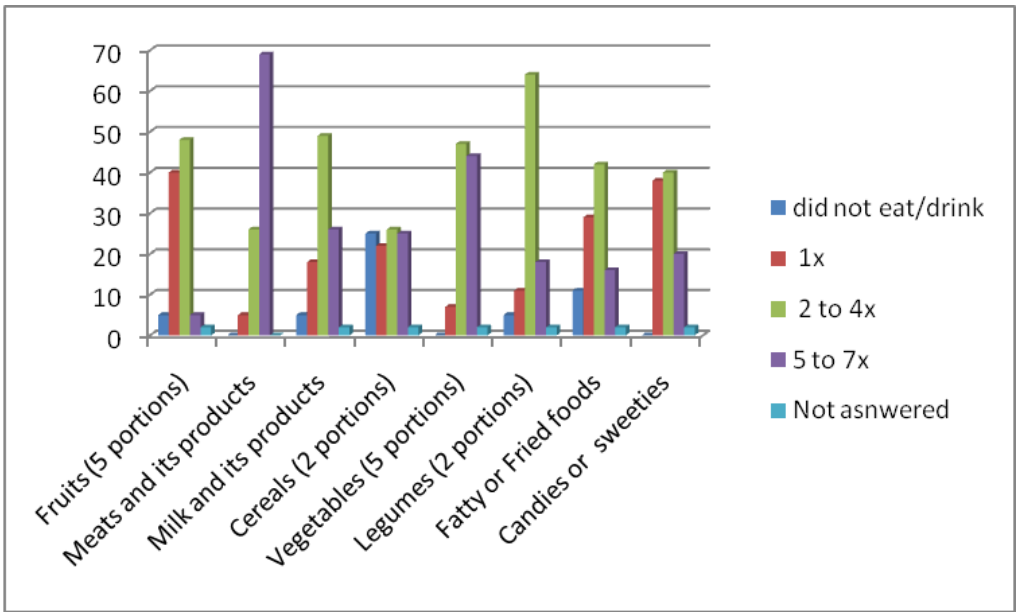

Figure 2 - Weekly intake of foods among health professionals from Middle Araguaia, Legal Amazon, Brazil.

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Table 2 - Weekly intake of daily recommend food portions among health professionals from Middle Araguaia, Legal Amazon, Brazil.

Foods	Everyday		5 days		3 days		Rarely eat/drink		NA		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Garlic	37	82	6	13	2	5	0	0	0	0	45	100
Coffee	27	60	3	7	6	13	9	20	0	0	45	100
Onions	26	57	5	11	7	16	7	16	0	0	45	100
Common beans	25	56	10	22	5	11	5	11	0	0	45	100
Eggplant	0	0	0	0	1	2	44	98	0	0	45	100
Red wine	0	0	0	0	2	5	43	95	0	0	45	100
Prunes	2	5	0	0	1	2	42	93	0	0	45	100
Broccoli	1	2	1	2	2	5	41	91	0	0	45	100
Honey	4	9	0	0	2	5	39	86	0	0	45	100
Nuts (Brazil nuts and cashew nuts)	1	2	0	0	5	11	39	87	0	0	45	100
Pequi (*Caryocar brasiliense*)	0	0	0	0	7	16	38	84	0	0	45	100
Cashew or its juice	1	2	3	7	6	13	35	78	0	0	45	100
Soy and its products (tofu, soy milk, soy protein)	4	9	1	2	6	13	34	76	0	0	45	100
Guaba or its derivative	1	2	2	4	9	20	33	74	0	0	45	100
Sesame seeds, linseeds or pumpkin seeds	5	11	0	0	8	18	32	71	0	0	45	100
Grape or grape juice	0	0	2	5	11	24	32	71	0	0	45	100
River fish	0	0	1	2	12	27	31	69	1	2	45	100
Natural or fruit yogurt	0	0	2	5	13	29	30	66	0	0	45	100
Chocolate (milk, semi-dark or dark)	1	2	2	5	14	31	28	62	0	0	45	100
Mango, peaches and/or red-yellow fruits	0	0	0	0	15	33	28	62	2	5	45	100
Cabbage	3	7	0	0	16	36	26	57	0	0	45	100
Breakfast cereals without added sugar (oat, wheat, barley, rye or corn)	6	13	0	0	14	31	25	56	0	0	45	100
Mate tea (*Ilex paraguaryensis*)	4	9	3	7	13	29	25	55	0	0	45	100
Brazilian cheese bread and milk sweety	1	2	5	11	14	31	24	54	1	2	45	100
Apple	2	5	4	9	17	38	22	48	0	0	45	100
Red beeets	1	2	0	0	23	51	20	45	1	2	45	100
Papaya or pumpkin	2	5	2	5	22	48	19	42	0	0	45	100
Orange (*Citrus sinensis*)	2	5	6	13	21	46	16	36	0	0	45	100
Oliva oil	10	22	6	13	16	36	13	29	0	0	45	100
Lemon (juice/marinated)	9	20	9	20	14	31	13	29	0	0	45	100
Bananas	3	7	4	9	26	58	12	26	0	0	45	100
Milk and cheese	11	24	10	22	16	36	8	18	0	0	45	100
Tomato, tomato sauce, tomato juice, ketchup and other products	5	11	17	38	16	36	6	13	1	2	45	100

Legend: NA = Not answered.

DISCUSSION

Since 36% of the people did not know or refused to answer about functional foods this fact could be considered a reflex of the fragmentation of the health sciences education in Brazil and the consequence of absence of knowledge of foods and nutrition in many curricula of both technical and undergraduate studies of nursing, as well as in the curricula of some medical schools.

A survey with people using the primary health care system reported that one important perceived barrier for adopting a healthy diet was not receiving information regarding the healthy diets or healthy foods (Lindermann et al., 2016). The same study also suggested that the lower dietary intake of healthy foods is generally due to their elevated cost when compated to common foods. The complaint of the high price of healthy foods was also observed in Saudi Arabia (Al Quaiz e Tayel, 2009) and to a lesser extent in Spain (López-Azpiazu and collaborators, 1999).

These arguments could be plausible to explain the lower intake of some healthier/functional foods.

In this study, meat, garlic, beans, and coffee were the major regularly consumed foods, whereas dietary intake of fruits was very lower. This is in accordance with the historic dietary culture of the people from this geographic region. According to Magalhães (2004), bovine meat, rice, beans, corn and manioc flours (dried and easy to store product), pig skin (brazilian-type of bacon),

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salt, garlic, vinegar, coffee, chicken, a little of vegetables, and river fish were the foods that constituted the typical diet during the XIX century in Mato Grosso and Goias States.

Data from the National Health Survey (NHS) (Claro and collaborators, 2015), a population-based study in Brazil, the daily dietary intake of meats reached 37.2% of the population, but in Mato Grosso state, it reached 55.1%. In the current study, 69% of people ate meats everyday.

As noted in the current study, in India food habits has also been changed from a traditional fashion to a Western ultraprocessed foods which are very caloric, and have high content of sugar, salt and fats. In this manner, Ghosh and Dutta (2010) reported that 61.8% of children and adolescents did not eat leafy vegetables at least once a week and that intake of fried, fat, sweets, processed and fast foods are largely higher compared to vegetables and fish.

The excessive intake of meats and fatty fried foods found in the current study is of great concern, since high dietary fat intake was associated with apnoea, hypopnea, and daytime sleepness, increasing the risk of a vicious cicle with intake of high energy fatty and sugary foods (Cao and collaborators, 2016).

In the current study, only 5% of the health workers from the public health system ate fruits everyday. On contrary, among health professionals from public health system of Pelotas municipality (Pretto and collaborators, 2014), South Brazil, the dietary intake of fruits was 27.6%. However, it should be emphasized that the regular dietary intake of fruits and vegetables is very important to improve human's health. So, the daily consumption of fruits and vegetables were one of the most important modifiable factors that was associated with decreased risk of myocardial infarction, according to the Interheart study, a 52 nations study (Yusuf and collaborators, 2004).

The unhealthy dietary pattern found in the current study with excessive intake of meats and fatty fried foods and lower intake of fruits and vegetables was also observed among health care workers from the Brazilian public health system living in Manaus, Amazon State, Brazil (Moura and Marinho, 2012).

A recent study in Brazilian population showed that between the cancer-attributable factors low consumption of fruits and vegetables and excessive body weight, due to eating of high-dense energy processed foods and physical inactivity, were very important variables (Azevedo e Silva and collaborators, 2016).

According to the National Health Survey (NHS) of Claro and collaborators (2015) the regular intake of candies and sweets was 17.7% in Mato Grosso state. This result is quite similar to that found in the current work (20%).

In Mato Grosso state (Claro and collaborators, 2015), the daily frequency of whole milk drinking was 66.1%, whereas only 24% of people drunk milk everyday in the current study.

It is important to consider that regular consumption of milk, dairy products, coffee, and fruits was inversely associated with risk of diabetes and metabolic syndrome in many studies (Elwood and collaborators, 2007; Fumeron and collaborators, 2011; Fonseca and collaborators, 2012; Hong and collaborators, 2012; Kwon and collaborators, 2010; Santos and collaborators, 2015; Yarmolinsky and collaborators, 2015).

A Japanese study reported that regular drinking of coffee was associated with decreasing risk of total mortality and by decreased risk of death from heart disease, cerebrovascular disease, and respiratory disease, the leading death causes in that country (Saito and collaborators, 2015).

Data from the National Health Survey (Malta and Szwarcwald, 2015), a Brazilian population-based study, showed that regular beans consumption reached 71.9%. In the current study, the regular consumption of beans was 78% which is very similar to data reported by the NHS.

Regular intake of beans is a very healthy choice, since that leguminosae is rich in fiber and antioxidants, displaying very interesting antioxidant, anti-inflammatory, hipolipidemic, anti-obesity, anti-diabetic and anti-cancer properties (Ferrari and collaborators, 2016; Suárez-Martínez and collaborators, 2016).

In the current study, 18% of health professionals ate junkie foods (fried foods and sweets/candies). Bhandari and collaborators (2016), studying Nepalese women, reported a very high regular consumption of junkies foods, ranged from 75.6% to 85.7%.

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In the current study, 9% reported daily consumption of soy and its products. A study in Araraquara, São Paulo State, reported that only 3% consumed soy or its products everyday (Bedani, 2007).

Onions were also very appreciated in this sample, since everyday intake was 68%. As reported for garlic, It should be noted that onions have also considerable antioxidant activity and anticancer properties as well as hipolipidemic effects on animals and humans (Ferrari, 2013, 2016; González-Peña and collaborators, 2015; Nicastro and collaborators, 2015).

It has been strongly recognized that Mediterranean diet is inversely associated with human mortality across Europe. Nutrition experts have suggested that food phytochemicals, especially the antioxidants, could be a plausible explanation for the health benefits of Mediterranean diet (Ferrari 2013; El-Sabban, 2014; Galas and collaborators, 2015; Nooyens and collaborators, 2015). It has been suggested that Brazilian traditional diet also offers potent cardioprotective benefits such Mediterranean diet had (Webber and collaborators, 2012).

CONCLUSIONS

The quality of eating of health professionals from Araguaia region should be improved by inclusion of both global, national, and regional foods with functional activities, and by reduction on the intake of fats, fatty foods, sweets, fried foods and meats.

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