Adv Health Behav, 2019, **2**(2): 79-84
DOI: 10.25082/AHB.2019.02.002

RESEARCH ARTICLE

Nutritional habits and lifestyle in a population of cancer patients in the south of Italy

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Abstract: The research involved a sample of 150 patients with a diagnosis of cancer, with the aim of assessing food habits and lifestyle. Smoking, physical activity and diet have been observed so as to seek for possible correlation with cancer. Patients involved had different types of cancer: data regarding correlation between diet and gastrointestinal cancer have been specifically assessed. Surprisingly, most patients, who declared to follow Mediterranean diet, instead, by actually analysing type and quantities of specific food , followed a different pattern. Therefore, in a population of South of Italy, one of the places which gave birth to Mediterranean diet, the protective effect of this kind of diet against many diseases is now at risk. Furthermore, a statistically significant correlation between nutritional pattern and gastrointestinal cancer has been found.

Keywords: prevention, nutrition, Mediterranean diet

1 Introduction

Many diseases, including cancer, can be caused by an inappropriate life style, including cigarette smoking, sedentarity, inadequate nutrition. Even the American Institute for Cancer Research, claims that 30% of tumors are owing to factors such as improper food, lack of physical activity and overweight.

Mediterranean diet is a nutritional pattern belonging to those countries around the Mediterranean Sea, including Italy, that in 2010 was declared by Unesco as immaterial cultural patrimony of human kind. From a nutritional point of view, it represents a well balanced pattern able to prevent diseases like obesity, diabetes, hypertension, dyslipidemia, some types of cancer, especially if combined with a proper lifestyle and a regular physical activity.

Which is the real lifestyle of a population from South of Italy with a diagnosis of cancer? This research has tried to give an answer to this question through the administration of questionnaires for a better comprehension of protective behaviors or risk factors related to occurrence of tumors. An appropriate nutritional lifestyle is protective both for occurrence of diseases and its complications[1].

Aim of the present research is to study nutritional habits and lifestyle of patients affected by cancer and, at the same time, to educate patients to improve quality of nutrition. Indeed, after the end of this study, a booklet about nutrition and cancer will be distributed, containing the following information:

(1) Promotion of a healthy nutrition through spreading of health supporting information and involvement of stake holders.

(2) Support of awareness and sense of responsibility towards health.

(3) Indications for a proper nutrition to lower the risk of cardiovascular diseases, diabetes, overweight and obesity and some types of cancer.

(4) Recommendations for patients with hypercolesterolemia, hypertrigliciridemia, hypertension, *etc*.

2 Materials and methods

This research was conducted from June 2016 to August 2017 on a sample of 150 patients with a diagnosis of cancer, aiming to analyze food habits and life style. Participants were recruited among those in charge to Oncology ward of De Lellis hospital in Catanzaro, within both inpatient and outpatient setting. A multiple choice

Received: August 12, 2019 **Accepted:** August 28, 2019 **Published:** August 30, 2019

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Citation: Mauro R, Capellupo M, Raffaele G, *et al*. Nutritional habits and lifestyle in a population of cancer patients in the south of Italy. *Adv Health Behav*, 2019, **2**(2): 79-84

questionnaire was used either by direct interview or by self-administration in case of patients able to do so. Before starting the interview, patients were informed about the aim of the study and respect of privacy.

The questionnaire was organized as follows:

(1) I section: general information such as age, anthropometric assessment, gender, job and previous or current diseases.

(2) II section: lifestyle information, *e.g.* cigarette smoking, food, sport and physical activities.

(3) III section: focus on food habits (types and quantities of specific food, frequency of consumption).

(4) IV section: more detailed information about food (dressings, beverages including use of alcohol, cooking methods and consume of canned and processed food).

Useful advice about food, nutritional features of specific ingredients and proper lifestyle were delivered within the interview, trying to motivate the patient to change[2].

The following information were specifically delivered:

(1) Nutrition should be varied and, except for precautions linked to specific diseases, should involve all different food existing in nature;

(2) It is better to split the nutritional day in three main meals and two snacks, one in the morning and one in the afternoon, to avoid food overload.

(3) A breakfast covering 20% of daily calories in order to face the overnight fasting is recommended.

(4) 1-2 Servings of seasonal fruit and vegetables, both at lunch and dinner, are recommended so as to provide for vitamins, minerals and anti-oxidant substances.

(5) Legumes should be consumed at least twice a week, ham and salami not more than once a week, eggs not more than twice a week, cheese should be consumed occasionally choosing those with less fat, white meat without fat should be preferred over red meat, cold water fish should be chosen more frequently than other types of fish, EVO oil is strongly recommended among dressings and, eventually, drinking 2 liters per day of water is even strongly recommended.

(6) Consumption of soda drinks, alcoholic beverages, cakes, sugar, honey, caffeine, fried food, animal derived fats should be limited.

(7) Maintenance of an adequate BMI and performance of regular physical activities are strongly recommended.

(8) Diet followed by this sample of patients was compared with a standard of Mediterranean diet (New nutritional Mediterranean Pyramid)[3].

Mediterranean diet promotes the consumption of protective food such as fruit, vegetables, legumes which, among other things, lowers the risk of developing cancer (in particular colon cancer)since they accelerate bowel transit and reduce absorption of cytotoxic substances thanks to a high content of fiber, besides, they have an antioxidant effect since they neutralize the negative action of free radicals generated by metabolic processes. (Figure 1)

EVO oil is used as dressing. Caloric daily intake is divided into 55-60% carbohydrates, 25-30% fats (generally vegetal) and 10-15% proteins.

Quantity, quality and frequency of consumption of food (preferring fresh food) are indicated in the Mediterranean Food Pyramid as follows:

(1) Daily consumption, during the main meals, of fruit (1-2 servings) vegetables (at least 2 servings) and bread, pasta, rice and other cereals (1-2- servings),preferably whole ones.

(2) Milk and dairy products (preferably low fat ones) 2-3 times/daily.

(3) EVO oil 3-4 times/day as dressing.

(4) Moderate consumption of wine according to social and religious traditions.

(5) Small quantities of dry fruit.

(6) Within a week, consumption of fish should occur at least twice, as well as legumes while meat (white or red) not more than twice; cold cuts (ham and salami) not more than once/week.

As far as meat is concerned it is necessary to remind that WHO claimed that red meat is probably cancerogenic while processed meat is certainly cancerogenic as well as tobacco and alcohol. Processed meat include sausages, wurstels, ham, canned meat, salami, salted meat, *etc.*[4]

Mediterranean diet is considered environmentally sustainable because the mainly involved food (cereals, fruit, vegetables) have a little impact on the environment if compared to animal derived food since, in the latter case, there is a much lower release of Carbon dioxide.

3 Results

The whole sample is composed of 150 patients with the following main diagnosis: 27% breast tumor, 18% gastrointestinal tumor, 7% lung cancer, 7% leukemia-lymphoma while 27% did not communicate an exact diagnosis. 10 Patients were affected by two different tumors and 4 persons by 3 tumors. Age was in the range 16-87 years (average 68 years) with 38% males and 62% females.

As far as jobs are concerned housewives (37) was the most common occupation along with retired (37) followed by clerks (28) teachers (10), then others types of job with very small numbers.

Approximately one third (35%) declared to have

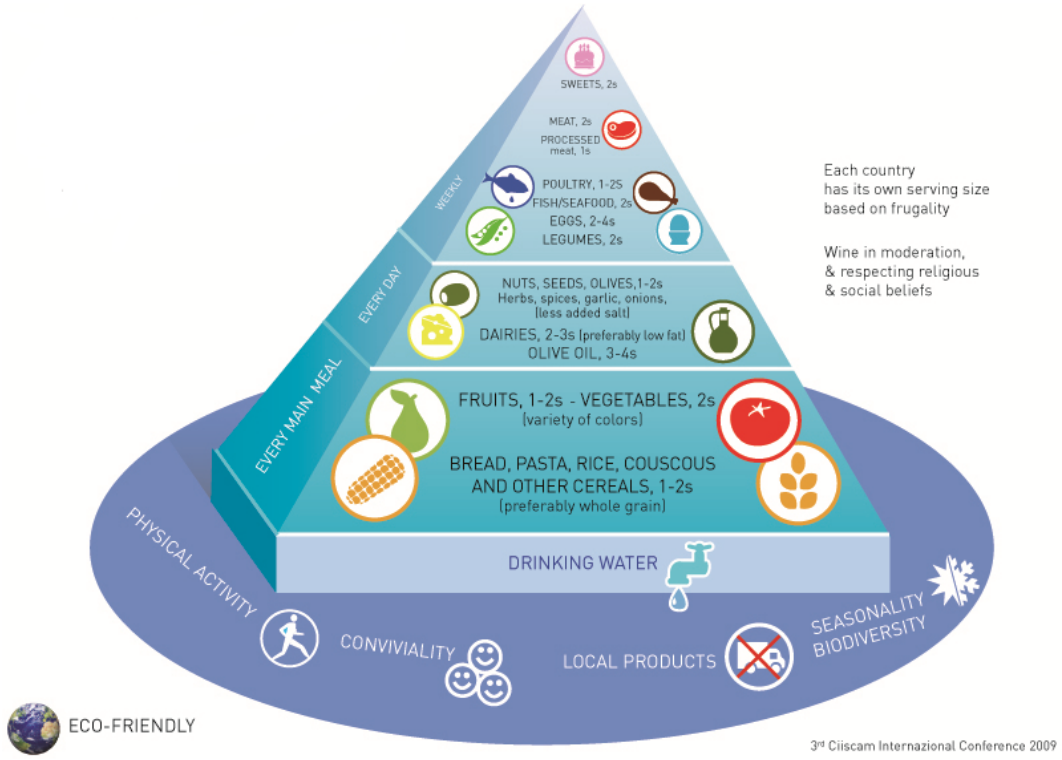


Figure 1. Modern mediterranean pyramid (adult population, 18-65 years old)

been a cigarette smoker before the diagnosis of cancer. Among smokers most of them quitted and only 9% continued to smoke even after the diagnosis of cancer, with a mean of 8 cigarettes per day.

Sedentary life style was a feature of 73% of patients.

According to BMI, these are the results: 73 normal; 27 underweight; 37 overweight; 5 grade I obese; 2 grade II obese; 6 no indication.

Combining these results, less than half (47.3%) of the total sample had a normal weight.

Regarding food habits, 112 subjects (75%) referred to follow a Mediterranean diet while 37 referred to be omnivore and only one patient declared to be vegetarian.

For a deeper understanding of health habits, data were analyzed in detail obtaining the following results: 93% of the sample have breakfast in addition to lunch and dinner and only 26% consume snacks besides main meals; 70% consume pasta every day; 47% eat bread once daily, 36% twice daily; 36% consume legumes once weekly, 30% twice weekly; 48% eat red meat once a week, 20% either twice a week or never; 45% eat white meat twice/week while 20% once and 20% thrice a week; 37% eat fish once/week, 33% twice/week. Egg consumption occurs once weekly in 49% of cases while twice per week in 25% of the sample. Consumption of milk is daily in 60% of patients while another 30% do not drink milk at all. Dairy products are consumed daily or thrice weekly in 40% of cases, twice/week in 17% of the sample and once per week in the remaining 28% of patients. 49% Consume vegetables one serving and 37% two servings per day. 29% eat cakes once a week, 43% never. 72% of the sample use EVO oil as dressing. Consumption of canned and processed food in addition to fresh food is reported in 58% of the sample.

4 Discussion

Although most of the sample declared to follow a Mediterranean diet, a detailed assessment showed that there is a difference between what was perceived by the patients and the actual standard of Mediterranean diet[2].

Indeed, by comparing the diet followed by 112 patients who referred to follow a Mediterranean diet with the above mentioned standard, important differences have been found. (Table 1)

Concerning consume of legumes, whose standard is at least twice/weekly, 50% (56 patients)is out of standard, including those eating legumes only once a week (40) and those who do not consume legumes at all (16).

Standard consumption of fish is twice per week, while 43% (48) eat fish only once/week and 6% (7) never, giving a result of 49% out of standard.

As far as fruit is concerned the situation is better; indeed, compared to a standard of 1-2 servings/day only

16% are out of standard because 47% eat fruit once and 37% twice daily

Pasta and rice are consumed one serving in 80 cases (71%) and two servings in 6 cases (5%) per day, while the remaining 24% are out of the recommended standard.

Even in case of bread consumption the evidence is quite similar: only 19% is out of standard while 48% (54) eat bread once and 37 (33%) twice per day.

Red meat is consumed once/day in 5 cases (4%) thrice/week in 8 patients (7%) so summing the two groups only 11% is out of standard.

White meat consumption is out of standard (two servings/week) in 23% of cases adding those consuming it daily (8) with those eating it thrice/week (18).

42 patients (37%) referred to eat processed meat more than once a week, overcoming the recommended regimen.

Only egg, milk and dairy products consumption is according to the standard.

Other relevant information are the cooking methods: in 35 cases (31%) frying and in 53 (47%) grill are used as cooking processes. It is worth to remember that cancerogenic substances, such as eterocyclic ammines, acrylamide and policyclic hydrocarbons are produced in case of frying or grill because of the high temperatures reached in these methods of cooking.

Most of the sample refers to use not only fresh food but even processed food (canned, frozen, salted food, *etc*.)

Data of the subgroup with gastrointestinal cancer were analyzed in detail. Among them 24 (21%) had a diagnosis of colo-rectal cancer and 3 (2.6%) had gastric cancer. In this kind of cancer there is a stronger scientific evidence of correlation with diet. (Table 2)

Only 2 patients (7%) consume vegetables according to the standard of Mediterranean diet while the remaining 93% is out of standard.

Fruit is consumed according to the standard in 20 cases (74%), so 26% do not meet the criterion of ideal consumption.

Bread and pasta are consumed as 1 serving in 16 cases (59%) or 2 servings in 1 case (3%) per day, while 9 (33%) are out of standard.

Bread consumption is proper in 24 cases (88% of patients).

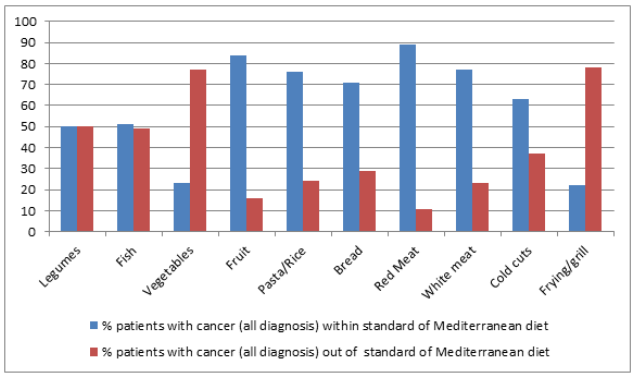
Consumption of legumes is out of the criteria of Mediterranean diet in77% of the persons belonging to this subgroup and consumption is adequate in only 8 cases (23%).

Fish consumption is below the suggested quantity in 44% of cases.

Use of red meat is above standard in 33% of the patients, while white meat is consumed above the suggested quantities in 44% of cases.

Table 1. Comparation of standard of and out of standard of Mediterranean diet in patients with cancer (n = 112)

	Patients with cancer within standard of Mediterranean diet	Patients with cancer out of standard of Mediterranean diet
	n (%)	n (%)
Legumes	56 (50%)	56 (50%)
Fish	55 (51%)	57 (49%)
Vegetables	26 (23%)	86 (77%)
Fruit	95 (84%)	27 (16%)
Pasta/Rice	86 (76%)	26 (24%)
Bread	91 (81%)	21 (19%)
RedMeat	99 (89%)	13 (11%)
White meat	86 (77%)	26 (23%)
Coldcuts	70 (63%)	42 (37%)
Frying/grill	24 (22%)	88 (78%)



Eventually, processed meat is consumed out of recommendations in 59% of cases.

Frying and grill are used by 23 people (85%); the exclusive use of fresh food occur only in 52% of the sample examined.

Data of a subgroup of patients with all diagnosis of cancer except for those with gastrointestinal cancer, have been analysed in Table 3 and Table 4. This subgroup includes 94 patients with other diagnosis of cancer. Even in this case differences with scientifically recognized standard of Mediterranean diet have been found and are reported as follows:

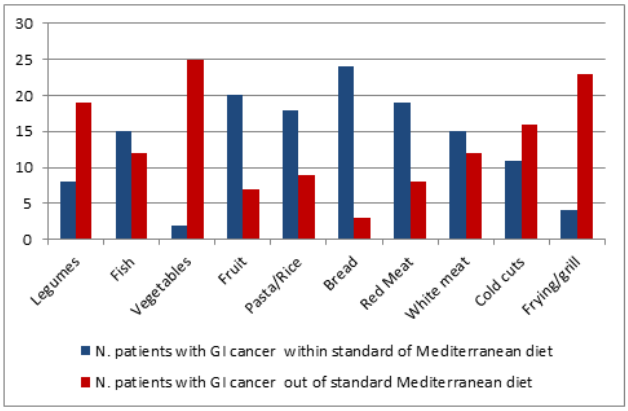
(1) As far as legumes consumption is concerned, 45% of patients (42 as absolute number) are out of standard (intended as a consumption at least twice a week) since this percentage includes those eating legumes once a week (33) and those who never consume them (9).

(2) A percentage of 44.6% (42) consumes fish only once/week and 5.3% (5) never, therefore 50% is out of standard corresponding to at least twice/week.

(3) Only 25% of the sample (24 patients) consumes the recommended 2 servings per day of vegetables, therefore 75% is out of standard since they consume less than two servings each day (43, corresponding to a percentage of 46%, consume one serving, while the remaining do not eat vegetables on a daily basis).

Table 2. Comparation of standard of and out of standard of Mediterranean diet in patients with GI cancer (n = 27)

	Patients with GI cancer within standard of Mediterranean diet	Patients with GI cancer out of standard of Mediterranean diet
	n (%)	n (%)
Legumes	8 (23%)	19 (77%)
Fish	15 (56%)	12 (44%)
Vegetables	2 (7%)	25 (93%)
Fruit	20 (74%)	7 (26%)
Pasta/Rice	18 (67%)	9 (33%)
Bread	24 (89%)	3 (11%)
RedMeat	19 (70%)	8 (30%)
White meat	15 (56%)	12 (44%)
Coldcuts	11 (41%)	16 (59%)
Frying/grill	4 (15%)	23 (85%)



(4) The situation is better considering fruit consumption. Indeed, in this case 46% of the sample consume 1 serving and 40% 2 servings/daily, so only 13% are not included in the standard that is at least one serving per day.

(5) Pasta and rice are consumed as 1 serving by 69 (73%) or 2 servings/day by 6 patients (6.3%), only the remaining 20% is out of standard.

(6) As for bread consumption data are quite similar: 47% (50) consume bread once daily and 31% (29) eat bread twice daily with the results that 18% are not included in the recommended daily consumption.

(7) Red meat is consumed once daily in 4 cases (4.3%) and thrice/week by eight patients so summing the two subgroups 11% of patients is over the recommended limit.

(8) White meat consumption is over the standard of 2 servings/week in 17 cases (18%), combining the cases of daily consumption (4) and those eating white meat thrice per week (13).

(9) 33 Patients (35%) consume ham and salami more than once/week that is the recommended standard.

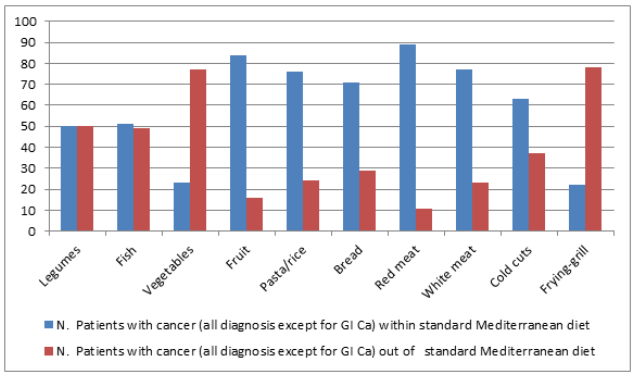
(10) Eggs, milk and dairy products consumption is according to the standard.

(11) Cooking methods include frying in 33% (28) and grill in 46% (44) of cases.

(12) All the sample considered declare not to use exclusively fresh food but even stored food (frozen and canned food stored with salt or oil or pickled).

Table 3. Comparation of standard of and out of standard of Mediterranean diet in patients with cancer (all diagnosis except for GI Cancer) (n = 94)

	Patients with cancer within standard of Mediterranean diet	Patients with cancer out of standard of Mediterranean diet
	n (%)	n (%)
Legumes	52 (55%)	42 (45%)
Fish	47 (50%)	47 (50%)
Vegetables	24 (25%)	70 (75%)
Fruit	82 (87%)	12 (14%)
Pasta/rice	75 (80%)	19 (20%)
Bread	76 (81%)	18 (19%)
Redmeat	84 (89%)	10 (11%)
White meat	77 (82%)	17 (18%)
Coldcuts	61 (65%)	33 (35%)
Frying-grill	22 (24%)	72 (76%)



Data between the two subgroups (GI Cancer and all diagnosis except GI cancer) were compared by using chi square test and Fisher test in that case in which the number of observations was less than 5.

In those with GI Cancer a statistically significant increased cold cuts consumption ($p < 0.024232$), red meat consumption ($p < 0.039164$)were found.

Furthermore in those with GI Cancer a statistically significant decreased vegetables consumption ($p < 0.043285$) and legumes consumption ($p < 0.018614$) were even found.

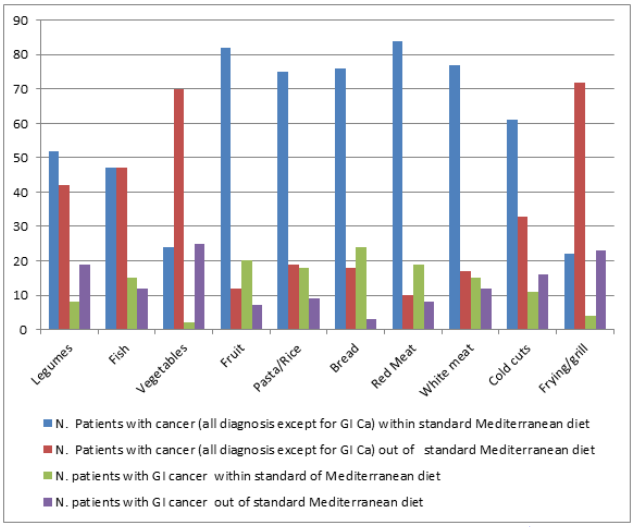
Although this data refer to a small sample it can confirm numerous previous evidences of the protective effect of Mediterranean diet against GI cancer.

5 Conclusions

Healthy lifestyle can surely contribute to a decreased risk for developing cancer, therefore it is necessary to maintain a normal weight, perform regular physical exercise, drink at least two liters per day of water, follow an appropriate nutrition including an adequate amount of fiber and a low caloric intake with limited consumption

Table 4. Comparation of standard of and out of standard of Mediterranean diet in patients with cancer/GI cancer (n = 121)

	Patients with cancer (all diagnosis except for GI Ca) within standard Mediterranean diet	Patients with cancer (all diagnosis except for GI Ca) out of standard Mediterranean diet	Patients with GI cancer within standard of Mediterranean diet	Patients with GI cancer out of standard of Mediterranean diet
Legumes	52	42	8	19
Fish	47	47	15	12
Vegetables	24	70	2	25
Fruit	82	12	20	7
Pasta/Rice	75	19	18	9
Bread	76	18	24	3
RedMeat	84	10	19	8
White meat	77	17	15	12
Coldcuts	61	33	11	16
Frying/grill	22	72	4	23



of salt, alcohol, fat meat, ham and salami, *etc*.[5]

Weight loss should be avoided in patients with cancer, since it can lead to malnutrition and cachexia.

Weight loss in cancer patients depends above all on the production of inflammatory mediators by the cancer itself. Diet has an important role to reduce inflammatory state and to recover a normal weight.

Data on the sample examined confirm that a sedentary lifestyle and an inadequate nutrition have a negative impact in cancer patients since they contribute to the development of optimal conditions for the proliferation of cancer cells as well as they increase the risk of cardiovascular diseases and diabetes, as it is suggested by scientific literature. Cancer patients should undergo a nutritional screening and a subsequent personalized diet. Furthermore these patients should be monitored all life long, considering the protective role that can be played by food to prevent chronic diseases and their complications.

In this article analysis of data has shown how Mediterranean diet can be protective against GI cancer.

Furthermore, this result should be combined with the evidence of table 1 showing how this sample of population of South of Italy is moving away from Mediterranean diet.

From an educational point of view an effort must be made in order to reinforce a healthy diet that nowadays is conquering the world and paradoxically risks to be abandoned just in that country which gave birth to it.

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