

Improvement of patient's nutritionnal management 2003 - 2006

Objectives and problematics

Specific objectives:

- Increase scientific knowledge on food eaten daily by diabetic patients in Mali
- Obtain scientific data of the impact of these eaten foods on Malian diabetic patients
- Develop diets adapted to Malian diabetic patients
- Improve the health staff's knowledge about the dietetics adapted to patients

Problematic:

A diabetic patient's treatment passes by the setting up of specific dietetics. This dietary program has a central role, particularly for some type 2 diabetics for whom a well followed diet is enough to balance the glycaemia and limit the postprandial hyperglycaemia or for the one for whom the oral anti diabetic agents or insulin are not systematically prescribed.

In Mali, specialised doctors have no precise scientific data on the dietary habits of patients by ethnic group, sex, age, socio-economical level...

These doctors have no biochemical data on the foods eaten locally (Malian rice, millet, sorghum...). They then use composition and glycemic index tables realised abroad (France or United states) with western foods that often have very different biochemical properties from the local foods.

Thus, diets taking into account the dietary habits of Malian patients and the composition of local foods are almost non-existent.

Improvement of patients' nutritional management 2003 - 2006

Realised activities

Activity 1: Detailed analysis of the dishes prepared and consummated in Bamako

This activity consisted in counting the different dishes consummated in Bamako, under the direction of a resource person having a good knowledge of the cooking of traditional dishes. All the information about these recipes were obtained from investigation forms taking again data such as: denomination of the dish, consumption forms, geographical origin, ingredients, quantity, mode and time of cooking, cost of the dish. Detailed biochemical analyses were done to characterize the exact nutritional properties of each dish.

The recipes are available on <http://www.santediabetemali.org/newsite/recette.htm>

You will find detailed information about the:

- ways of preparation used (gruels, dégué, couscous, tô)
- cereals used (rice, millet, fonio, corn, wheat)
- roots and tubers used (cassava, attiéke, potatoes stew – sweet potatoes, plantain bananas)
- prepared sauces (tomato, onions, peanuts, potato leaves, baobab leaves, black leaves, gumbo fresh or dried)
- others (beans, widjila)

Read/ download "the complete analysis of the dishes prepared and eaten in Bamako"

http://www.santediabetemali.org/newsite/rapport/axe1_act1.pdf

Improvement of patients' nutritional management 2003 - 2006

Realised activities

Activity 2: Analysis of the alimentary consumption of diabetic patients

This activity consisted in analyzing the food consumption of 80 patients suffering of type 1 or type 2 diabetes; they were selected in the list of diabetic patient followed at the Hospital Gabriel Touré (Bamako), in the Centre of fight against diabetes (Bamako) and at the national Hospital of the Point G.

The goal of this enquiry is to characterize the present consumption of patients, their perception of dishes, their mode of consumption, and the appreciation criteria for the «quality» of dishes. It was carried out with the methodology of the 24-hour recall (method of retrospective food consumption survey per maintenance).

A questionnaire made it possible to collect the socio-economic characteristics of the patients and their households, and also data concerning the disease of the patient or his consumption habits before and after the disease.

Read/ download "the complete analysis of patients' dietary consumption"

http://www.santediabetemali.org/newsite/rapport/axe1_act2_angl.pdf

Improvement of patients' nutritional management 2003 - 2006

Realised activities

Activity 2: Results

- Breakfast

- Porridge (made of different cereals such as rice, millet, corn, etc...)
- Bread with butter or mayonnaise

- Lunch

- Cereals with different types of sauces

- Diner

- Cereals with different types of sauces
- Chips, salads, chicken, etc...

The food consumption of diabetic patients presented no significant difference with the one of healthy people, as published by Mohamed Ag Bendesh during his study in Bamako where he used the same methodology (Ag bendesh, 1996).

Improvement of patients' nutritional management 2003 - 2006

Activity 3: Impact of the ingestion of the dishes studied on the patients suffering of diabetes mellitus

This activity enable us to make the map of glycemic index and to compare the postprandial glycemic responses, that is to say measured after the meal, of foods and sauces the most consumed by Malian diabetic patients. The choice of these foods was done starting from the results of the consumption inquiry presented in the activity 2. The protocol was realised on a group of 11 healthy people. Each one was tested twice in the same week for each one of the following dishes:

Fonio (couscous)
White rice
Sorghum (couscous and Tô)
Millet (couscous and Tô)
Corn (couscous and Tô)

5 sauces were studied:

- Peanut
- Gumbo
- Nadji (tomatoes)
- Fakoye (green leaves)
- Saga Saga (sweet potatoes leaves)

Results for the cereals

http://www.santediabetemali.org/newsite/rapport/axe1_act3_1_angl.pdf

Results for the sauces

http://www.santediabetemali.org/newsite/rapport/axe1_act3_2_angl.pdf

Improvement of patients' nutritional management 2003 - 2006

Realised activities

Activity 3: Impact of the ingestion of the studied dishes on patients suffering of diabetes mellitus

Results « Cereals »: Glycemic index of the tested cereals

Glycaemic index (GI)

Millet couscous	53,59 ± 7,13	} Weak GI
Fonio couscous	56,95 ± 8,73	
Sorghum couscous	60,84 ± 6,24	} Intermediaries GI
Corn couscous	64,47 ± 9,15	
White rice	66,40 ± 7,00	
Millet paste (Tô)	69,38 ± 5,55	} Elevated GI
Sorghum paste (Tô)	73,84 ± 11,64	
Corn paste (Tô)	76,78 ± 8,28	

We observe that the consumption of cereals with low glycemic index (fonio or millet couscous) or intermediaries (Sorghum or corn couscous, White rice, millet Tô) is preferable.

Improvement of patients' nutritional management 2003 - 2006

Realised activities

Activity 3: Impact of the ingestion of the studied dishes on patients suffering of diabetes mellitus

Results « sauces »: evolution of the glycaemia in the course of time

Sauces	Area under the curve (mmol/min/l)
Peanut	160 ± 28
Gumbo	126 ± 20
Nadji (tomato)	114 ± 35
Fakoye (green leaves)	108 ± 22
Saga Saga (sweet potato leaves)	96 ± 34

- Only the peanut sauce shows an area under the curve (AUC) significantly more elevated than the other tested sauces.

The area under the curve (AUC) makes possible to define the glycemic evolution induced by a food or a sauce on a defined period.

Improvement of patients' nutritional management 2003 - 2006

The two phases of study made it possible to evaluate the hyperglycaemic power of the main cereals consumed in Mali and to evaluate the influence of the 5 most sauces consumed in Mali on the postprandial glycaemic response. These results make it possible to orientate the nutritional choice of diabetic patients.

The 6 great alimentary recommendations for Malian patients are:

- the adaptation the frequency and the content of the daily meals (morning, midday, evening + snacks). These meals should respect the total energy intake recommended for the treatment.
- the integration of family leaders in the education sessions about diabetes in order to teach them the types of cereals and way of cooking that suit the most their diabetic relative's alimentation.
- the abandonment of the use of the dosing bowl because of the difficulty of its use and because it create a desocialization of patients, which is very bad for their dietary follow-up.
- the association of physical activities to diet.
- the adaptation of the type and way of preparation of cereals. The millet and fonio couscous are the best for the consumption of patients (Low glycaemic index). The Tô must be avoid. Patients must not be advised against any cereal, they just have to be careful about the ingested quantity.
- the adaptation of the sauces accompanying the cereal bases: patients must be seriously advised against peanut sauce because it contains too much proteins and lipids. The 4 other tested sauces (tomato; leaves; Gumbo and black leaves) presented no notable influence on the patients' postprandial glycaemia.

Improvement of patients' nutritional management 2003 - 2006

Realised activities

Activity 4: Setting up of adapted diets

The use of food tables obtained during the activities 1, 2 and 3 makes it possible to set up diets adapted to nutritional requirements and to socio-economic characteristics of each patient.

The last activity of the project then consisted of a clinical follow-up of patients in order to test the impact of adapted diets on these patients.

To realize this protocol, two groups of 18 voluntary diabetic patients were recruited and followed during 9 months. One group was submitted to hygienic and dietary advice every month during all the protocol. A control group did not follow education sessions.

A questionnaire to evaluate the patient's knowledge about his disease was used at time M0, M6, M7, M8 and M9 for the "educated" group and at time M0, M6 and M9 for the control group.

All the followed subjects had 4 measurements of the glycosylated hemoglobin (HbA1c) at regular interval (T0=0 month 0, T1=3 months, T2=6 months and T3=9 months).

You can have access to the complete results of the clinical follow-up

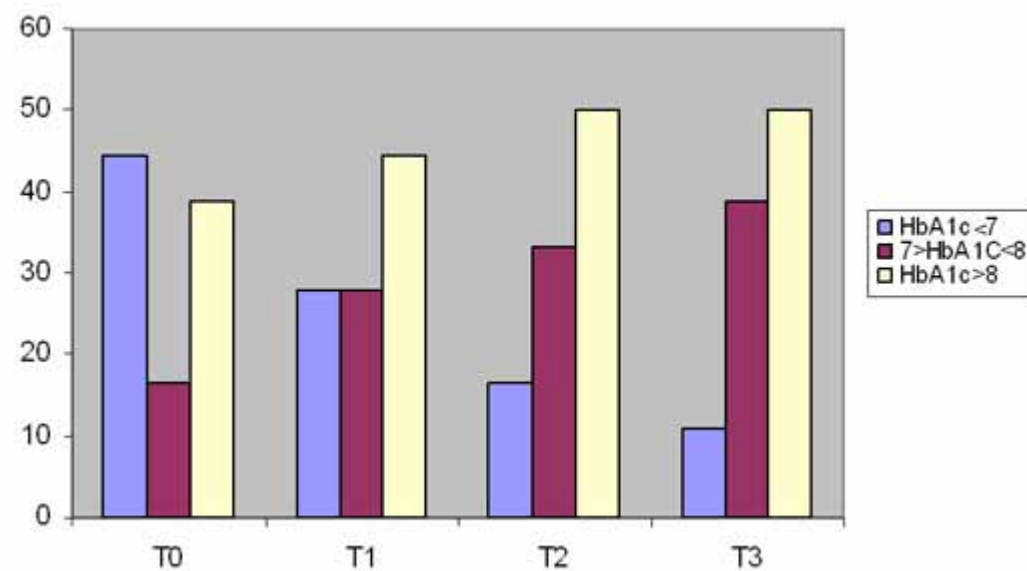
http://www.santediabetemali.org/newsite/rapport/axe1_act4.pdf

Improvement of patients' nutritional management 2003 - 2006

Realised activities

Activity 4: Setting up of adapted diets

Representation of the percentage of patients according to the HbA1c measures for the control group.



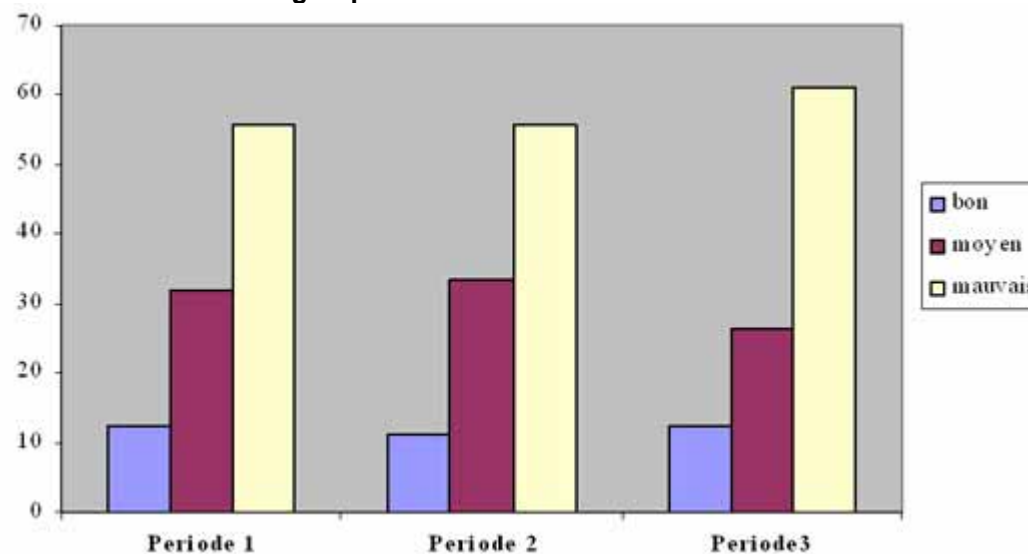
We see that the percentage of patients with an HbA1c rate below 7 decreases in the course of time.

Improvement of patients' nutritional management 2003 - 2006

Realised activities

Activity 4: Setting up of adapted diets

Representation of the percentage of patients according to the level of knowledge about their disease for the control group.



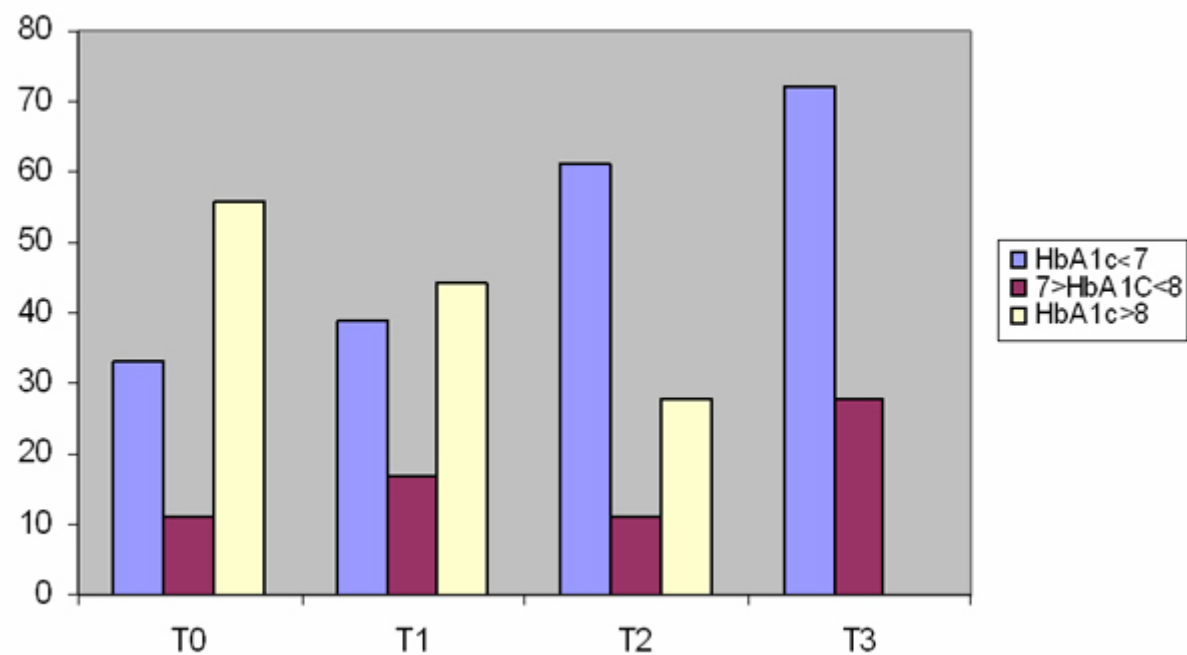
For this control group (that is to say the "non educated"), we observe no evolution of the patient's knowledge concerning his disease in the course of time.

Improvement of patients' nutritional management 2003 - 2006

Realised activities

Activity 4: Setting up of adapted diets

Representation of the percentage of patients according to the Hb1Ac measures for the educated group.



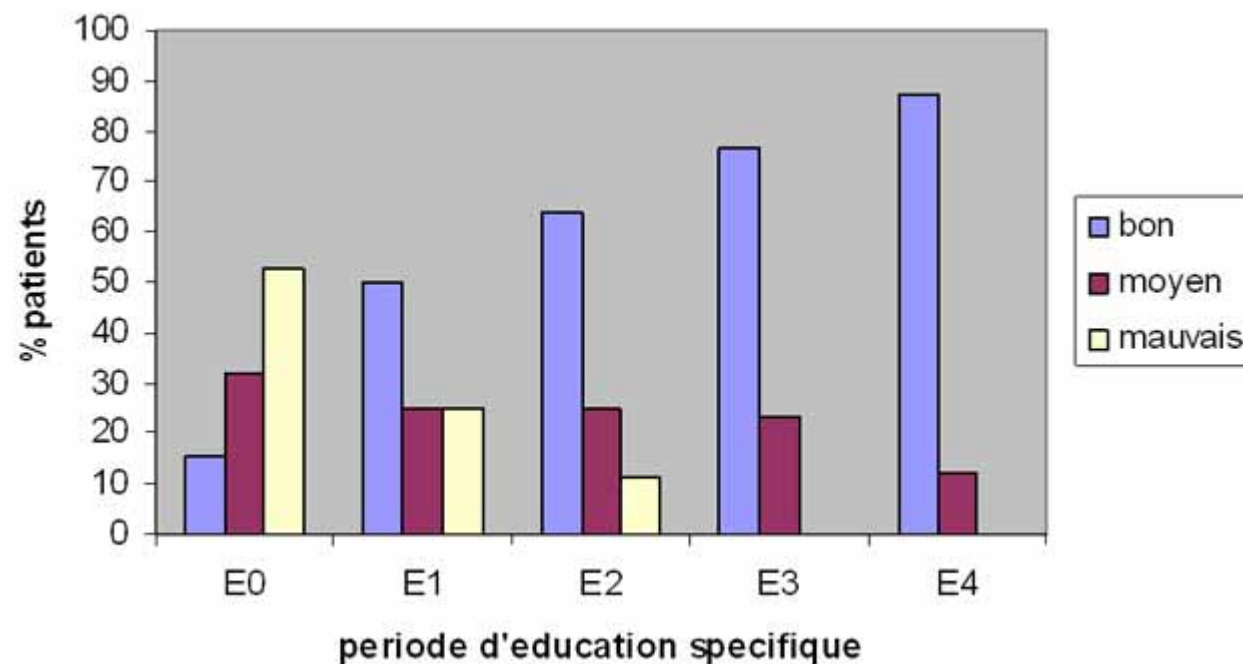
For this educated group, we see an increase of the percentage of patients with a low rate of Hb1Ac (below 7) in the course of time.

Improvement of patients' nutritional management 2003 - 2006

Realised activities

Activity 4: Setting up of adapted diets

Representation of the percentage of patients according to the level of knowledge about their disease for the educated group. (E0=0 month, E1=6 months, E2=7 months, E3=8 months and E4=9 months)



For the educated group, we see an increase of the level of the patient's knowledge concerning his disease in the course of time.

Improvement of patients' nutritional management 2003 - 2006

Realised activities

Activity 4: Setting up of adapted diets

We observe a positive influence of our alimentary recommendations:

A monthly education session has a favourable impact on the evolution of HB1Ac measures since the 3rd month. We observe that the effect is reinforced at the measures of the 6th and 9th month.

We observe that a good understanding and a correct following of the new alimentary recommendations makes it possible to balance the glycaemia of the educated patients, which lead to reduce the appearance of micro and macro vascular complications.

Consider the therapeutic education as an activity joint to the management of a diabetic. This therapeutic education must be regular.

Devote at least one hour of therapeutic education session per month for each patient makes it possible to ensure that the patient will really follow the medical recommendations.

Take into account the new alimentary recommendations during education sessions.

Enlarge therapeutic education sessions to all the family and relatives of the patient.

Reinforce the ability of specialised health centres for the management of diabetes by creating specific units for education on diabetes.