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# Study of the food balance sheet and risk factor search

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**Abstract**
Carbohydrate, lipid and protein nutrients provide the body with the energy it needs. However, an imbalanced diet of nutrients, especially in the labor force, including the category of students, poses a problem for human health. The objective of this study is to develop the assessment of the food balance and thus some risk factors for the students of 5 Moroccan universities. The results of this study show that most students are in a state of nutritional deficiencies despite their declaration that they consume all the necessary food and despite their knowledge of the causes and consequences of an unbalanced diet. Stress and the number of meals taken per day are two major risk factors. As a result, the authorities are called upon to multiply efforts to raise awareness and present adequate recipes for students' behavior.

**Keywords:** food balance sheet, risk factors, university students, Morocco

## 1. Introduction
At present, national and international authorities in all countries of the world are concerned with the short- and long-term consequences of malnutrition in their labor force, including the category of pupils and students [1, 2]. Eating behavior patterns or nutrient consumption patterns are promising strategies for studying the link between nutrition and cognitive functions in students, as they allow for the complexity of food intake to be taken into account [3]. The energy requirements of any living organism are continuous, while food intake is a discontinuous process. The periodic nature of food consumption has long been considered one of its essential characteristics [4, 5].
Food splitting is suspected to have effects on the physiology of the organism and in particular on the energy balance. In humans who have food at will, the common method of taking food is three or four meals a day, at fixed times and no nocturnal consumption [6].
In the student populations across the globe, the answer is simple: there are good and bad habits of life but still need to know which ones. Often confronted with a change in lifestyle as soon as they enter university, students often take bad habits in their everyday lives, sometimes without realizing it. Many factors then come into play to understand the poor eating habits of students.
What changes when you become a student: • Break with family habits - in terms of rhythm; - in terms of eating behavior. • An "unstructured working life" - lunchtime class schedules; - a "just in time" alarm clock; - nights until early morning. • Food independence - Responsibility for racing and meals; - the transition to student life: the beginning of food self-sufficiency, re-integrate the main principles of nutritional balance with students.
The work we have done will focus on eating habits and risk factors. For this purpose, we will describe the food profile through the calculation of the frequencies of food consumption, thus establishing the energy balance and looking for the risk factors for this behavior.

## 2. Materials and Methods
The survey was conducted among university students in some cities (Rabat, Marrakech, Tangier and Kenitra) during the period from 28 February to 10 May 2013.
The data were collected using a questionnaire completed by students leaving university campuses. The questionnaire includes 82 questions about the student's information and personal elements, Student Feeding, Knowledge of the Cause.

## 3. Results and Discussion
The study focuses on students aged 18 to 25, of whom 55.13% are female and 44.87% are male. More than half, or 57.06%, are between 18 and 20 years of age. Among the students surveyed, 1.85% is married. The majority of students, 55.40%, live with their families, 22.89% in the university campus and 20.8% in a studio or flat. Of all respondents, 43.69% are students of science and technology institutions, 22.89% belong to faculties of commerce, management and / or economics. 42.9% are in first year, 28.3% in second year, and then the number decreases to 2.4% in year 5 or more. 39.1% of the respondents are scholarship holders and 38.24% believe they have financial difficulties.

### 3.1 Frequency of food consumption in our sample
A food is a nutritious substance, therefore nutritious, capable of satisfying the appetite, so appetizing and usually consumed in the society considered, therefore customary [7, 8, 9].
Table 1 summarizes the frequencies, expressed as a percentage, of food consumption among the students surveyed.

**Table 1:** Frequency profile of food consumption

| Food | Unit | Frequency of non-consumers, in % | Frequency of consumers Between 1 and 5 times in% | Fréquence des consommateurs de plus de 5 fois, en % |
|---|---|---|---|---|
| Fruits / vegetable | Times / day | 1.49 | 66.54 | 31.97 |
| eggs | Eggs / week | 3.41 | 58.5 | 33.09 |
| Meat | Times / week | 13.19 | 80.58 | 0.64 |
| Chicken | times / week | 6.14 | 85.9 | 27.11 |
| Fish | times / week | 18.55 | 81.45 | 0 |
| Dairyproduct | times / days | 3.86 | 34.28 | 13.33 |
| Pastry | times / week | 19.1 | 60.6 | 17.74 |
| sodas | times / week | 25.84 | 59.54 | 14.61 |
| Coffee | glass / day | 27.5 | 53.04 | 20.46 |
| Tea | glass / day | 13.3 | 57.83 | 28.87 |
| Cigarette | cigarette / day | 86.82 | 8.4 | 0.29 |
| Alcohol | glass / day | 93.79 | 3.15 | 0.48 |

The results of the distribution of the respondents according to the frequency of food consumption (Table 1) show a great intra- and inter-feed dispersion. In addition, 1.49% of students surveyed do not consume fruit and vegetables, 66.54%, or two thirds, eat less than 5 per day and 31.97% consume more than 5. However, 3, 41% of students do not consume eggs, while more than half consume between 1 and 5 eggs per week. Similarly for dairy products, 3.86% reported that they do not consume milk and these derivatives and that 13.33% responded consuming it more than 5 times a day. Regarding the consumption of pastries and sodas, 60 of the students confessed the consumed between 1 to 5 times per week.

In addition, 13.19% do not consume red meat and almost the entire population (80.58%) consume 1 to 5 times a week. The distribution of chicken consumption follows the meat consumption pattern Red, 85.9% responded consumes it once to 5 times a week. However, 18.56% of students do not consume fish, 81.45% consume between one and five times a week.

For coffee consumption, 27.51% of students do not consume at all, 53.04% take on average less than one drink per day and the rest 20.46% take more than one drink a day. For the consumption of tea, 13.30% of students do not consume at all, 57.83% take on average less than one drink per day.

The results of this analysis show that 86.82% of students do not smoke tobacco and 93.79% do not consume alcohol.

In 2003, according to the Observatoire de la Vie Etudiante [10], 51% of the students surveyed took a reduced lunch (consisting only of a soup or a salad). One in three students do not think that eating is balanced. Meals are often taken quickly in cafeterias and fast food outlets. And according to the Emevia survey, one in five students only take two meals a day. According to a survey conducted by the National Union of Regional Student Mutuals (USEM) (2009) [11] on more than 12,000 students, there is a food imbalance: • more than 1/3 of the respondents living alone have a diet characterized by high consumption of processed, ready-to-eat products to the detriment of raw foods. 14% of students report no fruits or vegetables a day.

### 3.2 Food balance of the students surveyed

Carbohydrate, lipid and protein nutrients provide the body with the energy it needs. Usable energy is on average 4 kcal for carbohydrates as well as protein and 9 kcal for lipids. But these substances are not only energetic, they each have a specific role in the body, and the diet must provide a balanced nutritional package [12]. To evaluate food consumption, we have adopted the FAO adopted tool called "food balance" or "food supply balance" (WFP, 2009) [13].

After describing the food profile of the students surveyed, we studied the food balance corresponding to each one. The results for caloric, lipid, protein and carbohydrate balances are presented in Table 2.

**Table 2:** Distribution of students according to nutritional status and gender

| Balance sheet | Category | Female | Male | Chi-square | Yule | Odds Ratio |
|---|---|---|---|---|---|---|
| caloric | Hypo caloric | 33% | 32% | 0.37 | Positive | 1.29 |
| | Caloric normo | 3% | 3% | 0.01 | Positive | 1.07 |
| | calorie | 13% | 17% | 0.46 | Negative | 0.74 |
| protein | Protidal Hypo | 16% | 11% | 1.01 | Positive | 1.58 |
| | Proto-normo | 10% | 9% | 0.02 | Positive | 1.08 |
| | Hyperprotein | 25% | 29% | 1.04 | Negative | 0.66 |
| lipid | Hypo-lipid | 11% | 7% | 0.99 | Positive | 1.69 |
| | Lipid normo | 8% | 9% | 0.10 | Negative | 0.85 |
| | Hyper lipid | 31% | 33% | 0.31 | Negative | 0.79 |
| Total Carbohydrates | Hypo-carbohydrate | 20% | 17% | 0.60 | Positive | 1.38 |
| | Normo carbohydrate | 3% | 3% | 0.00 | Positive | 1.04 |
| | Hyper carbohydrate | 26% | 31% | 0.61 | Negative | 0.73 |

Moreover, more than half of the student population surveyed (65%) had a low-calorie diet, 6% had a normal calorie diet and 30% had a high-calorie diet. This can be explained by the fact that our study considers that a student has a hypo or hypercaloric regime with a range of 100 kcal difference.

27% of students have inadequate protein intake, 19% have a normal protein diet, and more than half have too high intake.

Eggs and chicken are the two main sources of animal protein in students. Dairy products also help to meet protein requirements, although they are less rich.

18% of students have insufficient lipid intake, 17% have normo-lipid diet, and 64% have too high intakes.

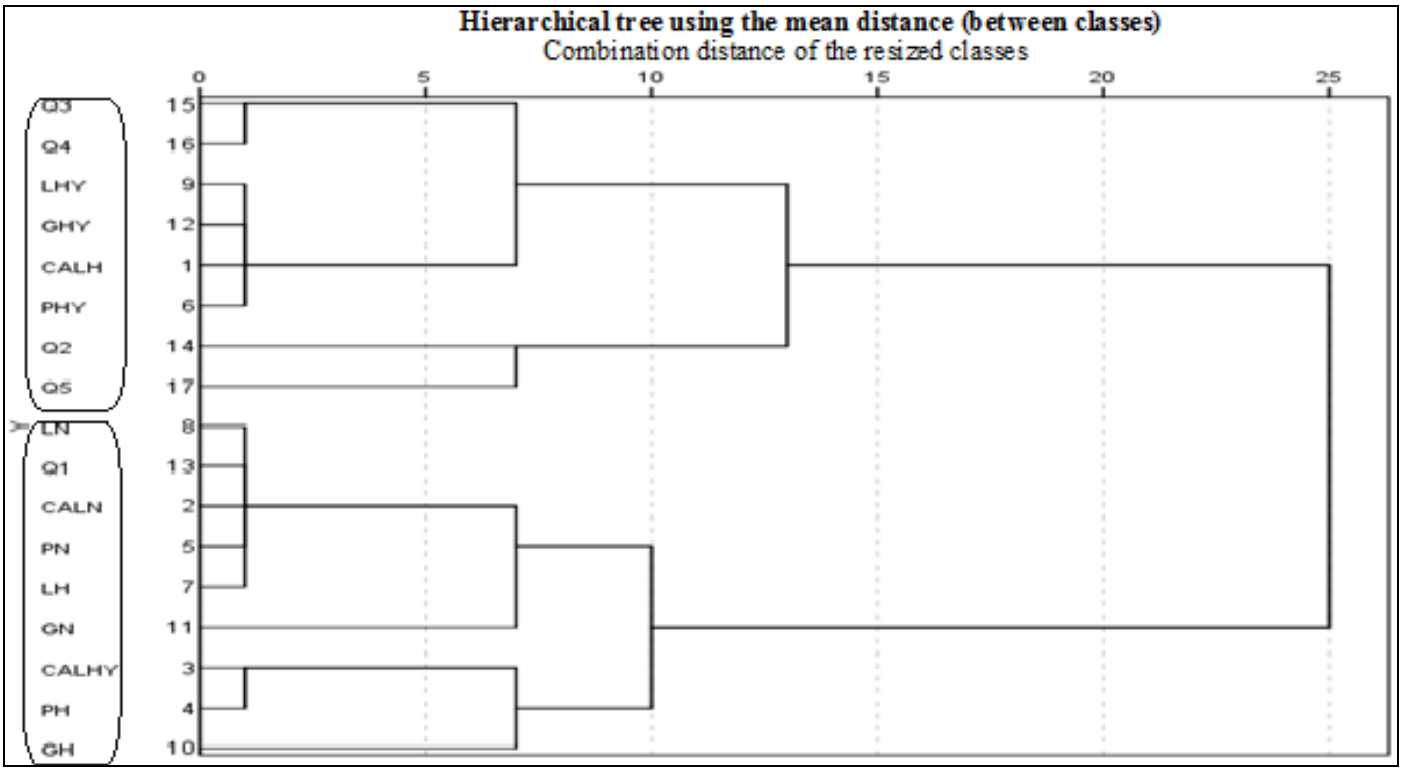
Regarding total carbohydrate intake, 37% of students are in a deficiency and 57% have high carbohydrate intakes. This phenomenon coincides with the high consumption of sweet teas and coffees, sodas and pastries

### 3.3 Knowledge of problems related to poor nutrition

To get an idea about students' state of knowledge about diet causes and consequences, we asked a few questions about our respondents regarding: impact and interactions. The cronbach index (0.94) shows that there is compatibility between intra and inter-questions, which gives a high reliability of our results obtained.

On the other hand, we used the hierarchical presentation (Fig.1). Indeed, the results of this analysis make it possible to collect the closest variables in the same group. At a distance of 10 malhanobis, we were able to classify the variables into 2 aggregates:

- The first group is characterized by students who, despite their knowledge of the impact of food on health, and their participation in food activities, have high lipid, carbohydrate and protein intake, and Insufficient caloric intake.
- The second group consists of students who have responded not using vitamin supplements and elsewhere have insufficient carbohydrate, protein, lipid intake but with a high caloric intake.




Calh: hypocaloric; CalN: normocaloric; CALHY: hypercaloric; LH: hypo-lipid; LN: norm-lipid; LHY: hyper lipidique; GH: hypo-carbohydrate; GN: normo-carbohydrate; GHY: hyper-carbohydrate; PH: hypo-protein; PN: normo-protein; PHY: hyper-protein; Q1: You take vitamin compliments; Q2: Does food have an impact on health; Q3: Do you have any knowledge of nutrition? Q4: do you eat balanced; Q5: have you a diet on health; Q3: Are you interested in food / health conferences

**Fig 1:** Hierarchical representation of the set of variables studied

The results which follow from this graphic representation clearly show that it is not the quantity which determines the quality of the load that one eats. As a student, we change our habits by moving to a life completely different from what we lived in. The usual energy intake of women and men aged 19 and over was 1,900 and 2,500 kilocalories per day, respectively, and decreases with age. Overall, energy percentages from proteins, carbohydrates and lipids are within acceptable values.

## 4. Study of the link between nutritional status and certain risk factors

To better situate the nutritional status of the students surveyed, we determined the number of meals per day and the psychic state of the students. The results of this analysis are shown in the Table 3. The chi-square test shows a strong link between the number of meals and sex, females tend to take 2 meals and the male three meals. In addition, all students report taking at least one meal a day. In addition, 63% of male students take

three meals a day, compared with only 40% for female students. With regard to the psychic state of students, the chi-square test to reveal links with sex. However, 47% responded suffering from stress during the examination period.

**Table 3:** Study of the linkage of meals per day and stress status according to the individual sex.

| Variable | | Female | Mal | Chi-square | YULE | ODDS | IC in 95% |
|---|---|---|---|---|---|---|---|
| Number of meals / day | 0 | 1 | 1 | 0 | 0 | 0 | 0.06-16.21 |
| | 1 | 14 | 4 | 6.11 * | 0.59 | 0.59 | 1.24-12.33 |
| | 2 | 45 | 32 | 3.57 * | 0.27 | 0.27 | 0.98-3.10 |
| | 3 | 40 | 63 | 10.59 * | -0.44 | -0.44 | 0.22-0.69 |
| State of stress | Not | 7.5 | 18.5 | 14.61 * | -0.57 | -0.57 | 0.14-0.55 |
| | Exam session | 25 | 22 | 0.98 | 0.14 | 0.14 | 0.76-2.4 |
| | often | 9 | 8 | 7.81 * | 0.44 | 0.44 | 1.31-5.1 |

## 5. Conclusion

The study we carried out on a large number of students representing five Moroccan university cities allowed us to know the eating habits and calculate the average nutritional intake of each student. The first observation that has been made and that despite the consumption patterns that characterize each city, the trend of students is almost the same. These students often find a mixture between traditional food and new ways of eating such as snacking or snacking. In general, according to the horizontal reading of the foods consumed, it is possible to establish a food balance which fluctuates between insufficiency and normal. So it is not quantity that determines the quality of the meals taken, but it is the choice of food and at the right time. All societies have secret ideologies that are defined as social attitudes towards food facts. There are foods of the rich and poor, urban and rural dishes, but the distinction can also be religious or moral. Nevertheless and despite the fact that students are aware of the consequences of bad habits of consumption, it does not respect a reasonable food table. This is probably attributed to the financial, and residential, charge of the courses. What these students are running. There is also a high consumption of teas and sweet coffees. Red meat and fish are consumed less often or in lesser quantities. Fruits and vegetables are usually not consumed enough compared to the recommended amount. Students reported having various psychic behaviors, so stress is the first disorder these students encounter and this most likely represents a risk factor.

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