

# Final Report on “Intervention program for promotion of physical activity and healthy eating in primary schoolchildren in Sousse, Tunisia”

## SECTION A. GENERAL INFORMATION

1. First Progress Report on “*Intervention program for promotion of physical activity and healthy eating in primary schoolchildren in Sousse, Tunisia*”

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4. Number: CFP-RPPH 14-16

5. Reporting period: from 1<sup>st</sup> September to 20<sup>th</sup> December 2015.

6. Objectives of the research proposal

**General objective:** The overall aim expected to be achieved from this research promote physical activity and healthy eating among primary schoolchildren.

**Specific objectives:** 3-5 clearly stated SMART specific objectives (specific, measurable, achievable, relevant to EMR, time-bound), which break-down the general objective

1. Demonstrate that five months intervention program with parents’ implication and structural changes for children aged 6 to 12 years in primary school is able to increase physical activity practice and reduce sedentary activity inside and outside schools by 12%.

2. Demonstrate that five months intervention program with parents’ implication and structural changes in primary school is able to decrease consumption of unhealthy snacks by 20% among children aged 6 to 12 years.

3. Demonstrate that six months intervention program with parents’ implication and structural changes in primary school is able to

**decrease consumption of snacks in the morning by 10% among children aged 6 to 12 years.**

## SECTION B. TECHNICAL REPORT

### Introduction:

Obesity is a growing worldwide epidemic, cited by the World Health Organization as one of the leading public health challenges of the 21<sup>st</sup> century (1). Surveys carried out since 1990 by the International Obesity Task Force (IOTF) have estimated the global prevalence of excess body fat in school aged children to be at ten percent with a quarter of those overweight children characterized as obese (2). With the rapid rise in childhood obesity rates comes an increased risk for chronic, non-communicable diseases including poor glucose tolerance and a raised risk of type 2 diabetes, pediatric hypertension, sleep apnea, as well as psychosocial conditions like depression and social exclusion (2). Furthermore, Whitaker et al (3) raises the significance of obesity prevention in childhood by providing evidence of it being a predictor for adult obesity and its impending consequences.

Once considered the concern of higher-income countries, low and middle-income countries are quickly beginning to experience the same trends. Increase in childhood obesity in the coming years is predicted to be 30% higher in low and middle-income countries (4). According to the surveys conducted by the IOTF, the Near/Middle Eastern region is ranked third in childhood overweight and obesity prevalence after only the Americas and Europe (2). While data for North Africa is limited (5), previous studies carried out in Tunisia have observed an increase in obesity rates of pre-school children (6), adolescents (5,7,8) and adults(6,9). This progression can imply

an overall increase in obesity rates for all ages, including primary school aged children, despite the lack of data (7).

A number of studies have noted the importance of the modification of risky behaviors (specifically physical inactivity and poor nutrition) in order to properly combat the rise of overweight and obesity rates (10,11). These risk factors are prominent among young people in Tunisia, and its results are marked through the epidemiological transition currently being experienced by the country (9). Therefore, this period of transition along with the suggestion from previous studies to tackle the obesity problem as early as possible to promote proper development (12), provides a crucial window for the encouragement of lifelong healthy habits.

Previous school based programs targeted towards primary school aged children have noted great successes in improving nutrition and physical activity behaviors worldwide (11, 13,14). Furthermore, WHO has developed a costing tool for countries to add or replace interventions based on needs or national priorities including “Best Buys” physical activity and nutrition intervention (15)

In Tunisia, a number of programs and legislation exist to encourage healthy behaviors in pre-school (aged 3-5 years) children; however, none exist to combat the problem in primary schools. Schoolchildren of this age group (6-12 years) often purchase high-energy density, trans fat rich snacks from nearby street vendors and adopt sedentary behaviors. In addition, increased sedentary behaviors has been linked to an increase in unhealthy snacking and a lack of adherence

to recommended dietary patterns (16) of three meals per day with one afternoon snack and discouraging morning snack (17-18).

The aim of this study was to promote physical activity and healthy eating among primary schoolchildren by demonstrating that five months intervention program with parents' implication and structural changes for children aged 6 to 12 years in primary school is able to:

- increase physical activity practice and reduce sedentary activity inside and outside schools by 12%.
- decrease consumption of unhealthy snacks by 20%.
- decrease consumption of snacks in the morning by 10%.

## METHODOLOGY

**Study design:** Quasi experimental study in primary schools in the region of Sousse Tunisia among children aged 6 to 12 years old.

We conducted this study with two groups: Intervention and control. We selected one primary school in each group. The participating primary schools were identified by convenience to ensure the feasibility of the intervention (an institution with motivated staff). This selection was done with the assistance of the regional direction of education of Sousse to have two comparable schools in term of number of primary schoolchildren and socio-demographic characteristics.

### Intervention Program:

The intervention program was been implemented in intervention primary school and concern all schoolchildren in this institution. It included:

- Educational activities targeting children, their parents, school and after school staff.
- Identification of group of schoolchildren leaders who have a role model to disseminate healthy habits to their colleagues.
- distribution of educational tools

- Physical activity sessions
- incentives for children: offer awards for children who improve their eating and physical activity habits
- incentives for the institution to improve their infrastructure to be adequate for practicing physical activity
- collaboration with administration to decrease the accessibility to unhealthy snacks in school and offer incentives for children who consume healthy snacks.

The table below describes the intervention activities.

Activity	Animated by	Target population	Principle
Training workshops about healthy eating,	Dietician and project team	1 session for teachers and school and after school staff 1 session for schoolchildren leaders	-healthy eating, -snacking in the morning could be at risk of obesity, -importance of eating breakfast -how to choose healthy snacks - valorize healthy habits
Physical activity promotion	Physical activity teacher(s) and project team	Ensure at least one hour session of physical activity per week for all schoolchildren.	- exercises adapted to sex, age, weight status. - opt for activities that enjoy children - propose exercises to insert in daily activities
Improve affordability and accessibility to healthy products	refreshment bar	Schoolchildren	Offer healthy snacks for children such as fruits, vegetables, bread, dairy milk products Limit accessibility at least in primary school to unhealthy product mainly trans fat, high fat and high salt food
Send SMS	Project team	for parents and children who have cell phone	-Twice a month -Promotion of physical activity and healthy diet Importance of parents implication
Distribution of intervention tools	Prepared by the project team	Schoolchildren Parents Primary school staff	Booklet with educational messages. Creation of Facebook group for dissemination of educational messages, activities of school, discussion with children and their parents..

**Study population:** We included primary schoolchildren enrolled in selected schools.

**Data collection** concerned randomly selected sample from intervention and control primary school from all grades (1st to 6th grade).

The intervention concerned all schoolchildren in intervention group.

We plan a delayed intervention in control group after the end of the project and post assessment data collection.

**Sample size:** Sample size estimates were based on a one-sided significance level of 0.05 and 80% power to detect between-group

- 12% difference in practicing 30 mn of daily physical activity.
- 20% difference in consumption of unhealthy snacks
- 10% difference in consumption of snacks in the morning

Assuming a failure to consent rate of 10% and a dropout rate of 10%, 330 participants in each group are needed to be referred.

**Sampling method:** A random sample of primary schoolchildren was been proportionally selected with stratification by level of education (1st to 6 th grade). We selected 9 classes from intervention school and 11 classes from control school.

**Data collection:** We used:

Questionnaire for parents to collect data about:

Socio-demographic and lifestyle habits of the participants was collected by a pre-tested questionnaire self administered for parents. It was administered at baseline and will be after 5 months of intervention. It contains variables about:

- age, sex, level of education of children
- age, sex, level of education of parents



- eating habits: food rhythm, kind of snacks consumed (healthy, unhealthy), time of snack consumption
- Physical activity habits, screen time, time for home works.
- Parental support in promotion of healthy eating and physical activity.

Questionnaire for children to collect data about:

Knowledge of participants about nutrition and physical activity, and snacks consumed the previous day of data collection. We used a self administered questionnaire simplified and adapted to the age of primary schoolchildren with the presence of trained interviewers and teachers. These data was collected at baseline and will be after 5 months of intervention.

Anthropometric measurements: Weight and high were collected at baseline and will be after 5 months of intervention for selected schoolchildren.

These measures were taken by pre-trained interviewers. Body weight was recorded over a light article of clothing to the nearest 0.1kg using a portable electronic scale. Standing height was measured with the participants in bare feet to the nearest 0.5 cm.

Ethical considerations: We received an ethical approval for this research from the Ethical Committee of Farhat Hached University Hospital.

We obtained signed consent from parent and oral consent from children who participated to this study.

**Activity implementation:**

The study began in 1<sup>st</sup> September. The following table describes the different activities we implemented during the period from 1<sup>st</sup> September to 20<sup>th</sup> December.

Time period	Activities
1 <sup>st</sup> September-15 <sup>th</sup> September	We prepared and pre-tested the Questionnaire for pre assessment. We prepared the consent form. We submitted the protocol of the study, questionnaire and consent form to the

	<p>Ethical Committee of Farhat Hached University Hospital for approval. We obtained the ethical approval for this study. Questionnaire and consent form impression. Data collectors' enrollment and training.</p>
15 <sup>th</sup> September - 1 <sup>st</sup> October	<p>Identification of primary schools: control and intervention. A sample of primary schoolchildren proportionally selected with stratification by level of education (1<sup>st</sup> to 6<sup>th</sup> grade). We selected 9 classes from intervention school and 11 classes from control school. We deposit a demand for agreement to undertake the study in primary schools to the Regional Education Direction of Sousse. Preparation and validation of intervention tool which consist on "Our school in health booklet"</p>
1 <sup>st</sup> October- 10 <sup>th</sup> November	<p>Data collection from schoolchildren and their parents in both intervention and control schools. Weight and high was collected for selected schoolchildren. Conception of intervention tool (attachment). Beginning data capture of collected data. We got the agreement to undertake the study from education authorities. Training session about healthy diet and physical activities for school and after school staff of intervention school in our department animated by dietetician and psychologist. Organization of open day for schoolchildren in intervention school: offering healthy snacks, animation during breaks with different physical activities (dance, competitions with awards..) and workshops during class sessions (gardening, tasting workshops, cooking..). Distribution of intervention tool "Our school in health booklet"</p>
10 <sup>th</sup> November - 1 <sup>st</sup> December	<p>Sending SMS for schoolchildren parents about healthy diet and physical activity. Animation of workshops in intervention school with project team, dietician and</p>

	teachers: about healthy diet, fruits and vegetable of the season... Quizzes and competitions with distribution of rewards. Distribution of sports equipments for the school to improve physical activity practice. Improvement of healthy snacks affordability in refreshment bar. Offer of gifts for children who by healthy snacks.
1 <sup>st</sup> December – 12 <sup>th</sup> December	Period of exams Identification of schoolchildren leaders with teachers and organization of their training.
12 <sup>th</sup> December – 20 <sup>th</sup> December	Training for schoolchildren leaders about healthy diet, promotion of physical activity with limited area and how to give advice to pairs.

### Preliminary Results:

*N.B: These results are based on the data that we have already entered by the date of December 20<sup>th</sup> 2015 (some data are still being entered but for the imperative reason of sending the final report before the end of the month, we are analyzing the current set of data)*

### Sociodemographic characteristics at pre assessment:

Table I: Sociodemographic characteristics of participants in intervention and control groups:

	Intervention group n (%)	Control group n (%)
Sex :boy	114 (52.2)	70 (45.8)
Mother's education level :Primary	37 (13.6)	40 (26.3)
Father's education level :Primary	35 (12.9)	39 (26.0)
Attend an After-school	76 (27.7)	30 (20.3)

The mean age of participants was 8.8 ±1.7 years and 7.8 ± 1.8 years old respectively in intervention and control groups.

### Eating habits:

Table II: child eating rhythm according to parents in intervention and control groups:

	Intervention group n (%)	Control group n (%)

<b>Breakfast</b>	<b>246 (90.4)</b>	<b>133 (88.1)</b>
<b>Snack in the morning</b>	<b>180 (66.2)</b>	<b>105 (69.5)</b>
<b>Lunch</b>	<b>256 (94.1)</b>	<b>133 (88.1)</b>
<b>Snack in the afternoon</b>	<b>166 (61.3)</b>	<b>77 (51.0)</b>
<b>Dinner</b>	<b>243 (89.3)</b>	<b>138 (91.4)</b>
<b>Other snacks (nibbling)</b>	<b>38 (14.0)</b>	<b>29 (19.2)</b>

**Table III: Consumption of snack in the morning the day before data collection:**

<b>Snacking in the morning</b>	<b>Intervention group n (%)</b>	<b>Control group n (%)</b>
<b>Didn't take a snack in the morning</b>	<b>97 (32.1)</b>	<b>48 (25.7)</b>
<b>Dairy product</b>	<b>34 (11.3)</b>	<b>29 (15.5)</b>
<b>Fruit</b>	<b>37 (12.3)</b>	<b>22 (11.8)</b>
<b>Vegetable</b>	<b>2 (0.7)</b>	<b>2 (1.1)</b>
<b>Bread</b>	<b>35 (11.6)</b>	<b>42 (22.5)</b>
<b>Unhealthy snack (high fat and carbohydrate)</b>	<b>97 (31.1)</b>	<b>44 (23.5)</b>

**Table IV: Consumption of snack in the afternoon the day before data collection:**

<b>Snacking in the afternoon</b>	<b>Intervention group n (%)</b>	<b>Control group n (%)</b>
<b>Didn't take a snack in the afternoon</b>	<b>111 (37.0)</b>	<b>93 (49.7)</b>
<b>Dairy product</b>	<b>30 (10.0)</b>	<b>18 (9.6)</b>
<b>Fruit</b>	<b>37 (12.3)</b>	<b>26 (13.9)</b>
<b>Vegetable</b>	<b>2 (0.7)</b>	<b>0 (0.0)</b>
<b>Bread</b>	<b>50 (16.7)</b>	<b>25 (13.4)</b>
<b>Unhealthy snack (high fat and carbohydrate)</b>	<b>60 (20.4)</b>	<b>25 (12.9)</b>

The proportion of children who didn't take snack in the morning was 32.1% and 25.7% respectively in intervention and control group. This proportion was higher in the afternoon in the two groups. However unhealthy snacks are most frequent in the morning in the two groups.

The proportion of children who didn't eat anything between meals time was 67.6% vs 72.6% in intervention and control groups.

### Physical activity habits:

Table V: Number of days participants are physically active for a total of at least 30 minutes per day

	Intervention group n (%)	Control group n (%)
0 day per week	55 (21.3)	24 (17.1)
1 day per week	45 (17.4)	49 (35.0)
2 days per week	63 (24.4)	15 (10.7)
3 days per week	43 (16.7)	22 (15.7)
4 days per week	19 (7.4)	7 (5.0)
5 days per week	11 (4.3)	7 (5.0)
6 days per week	3 (1.2)	3 (2.1)
7 days per week	19 (7.4)	13 (9.3)

Table VI: More than 2 hours a day participants usually watch television (including videos), use a computer for non-school use, sit and talk with friends, or does other sitting activities

	Intervention group n (%)	Control group n (%)
Week day	100 (32.5)	69 (36.3)
Week end	169 (54.9)	112 (58.9)

### Comments and recommendations:

We note that eating and physical activity habits need improvement to prevent obesity and NCDs at adulthood. The main actions should target eating rhythm to decrease consumption of snacks in the morning and improve quality of snacking particularly in the afternoon to avoid nibbling.

Concerning physical activity, there's an important proportion of children who don't practice regular physical activity. This risk factor could be improved by the adaptation of the environment, education of children and their parents for the importance of physical activity.

### Actions remaining to be done:

Due to the delay in the reception of the first installment of the grant, all our activities in this project were postponed. That's why; we did not finish the intervention program and not collect post intervention data yet.

The evaluation of results will be done by the comparison pre post assessment in each group.

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