Baseline characteristics of a school based intervention to prevent non communicable diseases risk factors: project “Together in Health”

Résultats de l'état des lieux d'une étude d'intervention en milieu scolaire pour la prévention des facteurs de risque des maladies non transmissibles: projet "ensemble en santé"

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RÉSUMÉ

Prérequis : Le tabagisme, l’alimentation déséquilibrée et le manqué d’activité physique représentent les principaux facteurs de risque des maladies non transmissible. C’est pour cela qu’une intervention de prévention doit être instaurée dès le jeune âge.

But : nous présentons le projet «Ensemble en santé » dans les écoles, une composante d'une intervention à l’échelle communautaire. Il consiste en une intervention en milieu scolaire dont l’objectif est d'améliorer les connaissances, les attitudes et les comportements concernant les principaux facteurs de risque des maladies non transmissibles.

Méthodes: étude quasi expérimentale avec deux groupes intervention et contrôle. L'étude a concerné les élèves des collèges de Sousse âgés de 11 à 16 ans. L'évaluation de la pré intervention a porté sur un échantillon stratifié et proportionnel. Il a été composé de 4003 élèves soit 1929 et 2074 élèves respectivement dans les groupes d'intervention et de contrôle. Nous avons utilisé le test du Chi deux pour comparer les pourcentages avec un seuil de signification de 5%.

Résultats: Le sexe ratio a été égal à 1 dans le groupe d'intervention et 0,87 dans le groupe contrôle. L'âge moyen de notre population a été 13,48 ± 1,29 ans et 13,24 ± 1,25ans, respectivement dans les groupes d'intervention et de contrôle avec une différence significative (p <10-3). Les élèves qui ont déclaré pratiquer une activité physique quotidienne représentaient 19,1% et 12,7% respectivement. En ce qui concerne les habitudes alimentaires, la fréquence de la consommation de certains aliments et boissons respectivement dans le groupe d'intervention et de contrôle: les légumes de 3,9 et 4,81 jours par semaine, des fruits 5,41 et 5,7 jours par semaine, aliments riches en matière grasse 2,49 et 2,48 jours / semaine, boisson riche en sucre 3,84 et 3,3 jours par semaine, des bonbons 4,33 et 4,57 jours par semaine. La proportion de fumeurs irréguliers a été respectivement de 6,8% et 2,2% chez les garçons et les filles dans le groupe d'intervention et de 11,3% et 0,9% dans le groupe contrôle.

Conclusion: Les interventions intégrées et durables contre les facteurs de risque des maladies non transmissibles dans cette région sont nécessaires pour prévenir ces maladies dès l’enfance.

Mots-clés

Intervention- maladies non transmissibles- élèves

SUMMARY

Background: Tobacco use, unhealthy diet, and physical inactivity are among the leading causes of the major non communicable diseases. So, prevention should take place early in childhood.

Aim : In this paper, we will present an overview of project “Together in health” in schools, a component of a community based intervention. It consists on a school based intervention with the aim to improve knowledge, attitudes and behaviors concerning the main chronic disease risk factors such as unhealthy diet, physical inactivity and smoking.

Methods: We conducted a quasi experimental design with intervention and control groups. The study concerned pupils of colleges of Sousse aged 11 to 16 years old in 7th and 9th grade. The pre-assessment concerned a randomized sample of schoolchildren. The proportional and stratified sample was composed of 4003 schoolchildren with 1929 and 2074 respectively in intervention and control groups. We used chi square test to compare percentages with 0.05 level of significance.

Results: The sex ration was been 1 in the intervention group and 0.87 in control group. The mean age of our population was been 13.48±1.29 and 13.24±1.25 respectively in intervention and control groups with significant difference (p<10-3).

Schoolchildren who reported practicing physical activity daily represented 19.1% and 12.7% respectively in intervention and control groups. Concerning eating habits, the schoolchildren reported frequency (number of days per week) of consuming various foods and beverages included respectively in the intervention and control group: vegetables 3.9 days/week and 4.81 days/week, fruits 5.41 days/week and 5.7 days/week, high fat food 2.49 days/week and 2.48 days/week, sweetened beverage 3.84 days/week and 3.3 days/week, sweets 4.33 days/week and 4.57 days/week.

The proportion of irregular smokers was been respectively 6.8% and 2.2% among boys and girls in the intervention group and 11.3% and 0.9% in control group.

Conclusion: Integrated and sustainable interventions against non communicable disease risk factors in this region are needed to prevent these diseases early in childhood.

Key-words

Intervention- non-communicable disease - pupils

Tobacco use, unhealthy diet, and physical inactivity are among the leading causes of the major non communicable diseases. These preventable factors contribute substantially to the global burden of disease, death and disability [1,2]. Of the 57 million global deaths in 2008, 36 million, or 63%, were due to NCDs, principally cardiovascular diseases, diabetes, cancers and chronic respiratory diseases [3]. As the impact of NCDs increases, and as populations' age, annual NCD deaths are projected to continue to rise worldwide, and the greatest increase is expected to be seen in low- and middle-income regions. While popular belief presumes that NCDs afflict mostly high-income populations, the evidence tells a very different story. Nearly 80% of NCD deaths occur in low-and middle-income countries [3]. This is the case of Tunisia where we are facing an epidemiological transition with increase of chronic disease with their risk factors and decrease of non communicable diseases [4-5].

These three lifestyle risk factors are important not only for their etiological significance but also because they are modifiable risk factors and at the distal end of the causal chain, which means there is greater opportunity for their prevention [6-7]. Thus, there is an important need to focus intervention on developing countries to evaluate the effectiveness of chronic disease risk factor prevention in this population. These interventions should take place early in childhood. In fact, the need for early intervention to promote healthy lifestyle in childhood is recognized [8] because children show signs of risk factors for chronic diseases that often persist into adulthood [8-10].

To help combat chronic diseases in developing countries, the UnitedHealth Chronic Disease Initiative and the NHLBI support a global network of Collaborating Centers of Excellence. Each center includes a research institution in a developing country paired with at least one partner academic institution in a developed country [11].

The overall objective of the Tunisia Collaborating Center of Excellence called the Chronic Disease Prevention Research Center is to determine the effectiveness, feasibility, and necessary cultural adaptations of evidence-based interventions directed at tobacco use, unhealthy diet, and physical inactivity in adults and children.

In this paper, we will present an overview of project "Together in health" in schools, a component of a community based intervention. It consists on a school based intervention with the aim to improve knowledge, attitudes and behaviors concerning the main chronic disease risk factors such as nutrition, physical activity and smoking. The study design, implementation and baseline results are explained within this paper.

MATERIAL AND METHODS

Study design:

We conducted a quasi experimental design with intervention and control groups. The intervention group is located in delegation of Sousse Jawhara and Sousse Erriadh and control group is located in delegation of Msaken. The pre assessment was done in 2009 and the intervention will continue until 2013. The post assessment will be done in school year 2013/2014.

Studied population:

The study concerned pupils of colleges of Sousse aged 11 to 16 years old in 7th and 9th grade. The pre-assessment concerned a randomized sample of schoolchildren. The intervention group was randomly selected from all colleges of the intervention zone. So there were nine intervention schools. The control group was randomly selected from all colleges of the control group. So there were eight control schools.

The proportional and stratified sample was composed of 4003 schoolchildren with 1929 and 2074 respectively in intervention and control groups. Response rate was been 93.1% and 96% respectively in intervention and control group.

Sample size calculation were based on a significance level of α=0.05%, power of test β=20%, two sided test of hypothesis and 6% change in risk factors levels (smoking, unhealthy diet and physical inactivity).

Data collection:

We used the Community Intervention for Health youth module evaluating knowledge of, attitudes towards and beliefs on the three risk factors for chronic disease: unhealthy diet, physical inactivity and tobacco use. We also collect biometric measures such as height, weight and waist circumference. Body weight was recorded to the nearest 0.1kg using a portable electronic scale. Standing height is measured with the participants in bare feet to the nearest 0.5 cm. waist circumference is measured to the nearest 0.1cm using a non stretchable standard tape measure. The measurement was been taken over a light article of clothing, at the smallest diameter between the costal margin and the iliac crest.

The questionnaire was been self administered in classes with the presence of trained medical doctors to assist children filling out the questionnaires.

Variable definition:

Definition of overweight and obesity: Body mass index was computed as the ratio of the body weight to the body height squared expressed as kg/m2. To define overweight and obesity, we used the recent international cut-off values of BMI [12].

Definition of smoker: daily smoker is the person who smokes at least one cigarette per day. Irregular smoker is the person who smoked at least one cigarette last month. Non smoker is the person who didn't smoke last month.

Intervention program:

The intervention program required several preparations before it starts. In fact, we informed the regional direction of health, the regional direction of education and the Association of Life Sciences and Earth Teachers. We have also held meetings with the directors of the participating institutions to introduce our project and explain its objectives.

Among the actions of intervention, it includes:

• Information meetings and training for teachers and inspectors of the life sciences and earth. These meetings have raised awareness of the presents on the importance of the intervention to prevent chronic disease risk factors. It was also an opportunity to have training for the presentation of courses for healthy diet promotion and tobacco prevention.

• The same meeting and training had been organized for physical

activity teachers to promote physical activity and animate sessions about physical activity promotion.

• The other important intervention activity was been the organization of schoolchildren leaders group in each intervention college. They had training where we emphasize the importance of their role of models and their actions in college for the fight against tobacco or for healthy diet and physical activity promotion.

• The project team produced brochures

These leaflets were distributed to students for support of the intervention. They have included epidemiological data on the topic and outline the factors that lead to smoking and the benefits of smoking cessation

• Training of student leaders. This training, made in the presence of student leaders 'experts', has raised awareness among students about the importance of the role of peers in the fight against tobacco.

• The organization by the student leaders of awareness day for anti smoking in their colleges.

• Creation of a Facebook group called "Together for Health" where students' leaders are administrators. This group has allowed the exchange of information between students and their friends on the topic. The project team uses this group to upload photos and videos of the different activities which took place in schools with the collaboration of the Chronic Disease Prevention Research Center.

Data analyses:

Statistical analysis was performed using the SPSS 10.0 software. Data were presented as frequencies, means and standard deviation.

We used chi square test to compare percentages and independent sample t test to compare means between the two groups with 0.05 level of significance.

Ethical consideration:

Because of the young age of the studied population, this investigation was undertaken with respect of the rights and the integrity of people. Parents gave their consent and they were able to refuse their children participation. We used an anonymous questionnaire that did not contain the name or the address of students.

The intervention consists on educational messages which haven't any harmful consequences for schoolchildren.

RESULTS

The studied population was composed of 4003 schoolchildren with 1929 and 2074 respectively in intervention and control groups. The sex ration was been 1 in the intervention group and 0.87 in control group. The mean age of our population was been 13.48±1.29 and 13.24±1.25 respectively in intervention and control groups with significant difference (p<10-3).

The proportion of overweight and obese schoolchildren in the intervention group was been respectively 20.6% and 7%. There wasn't significant difference between boys and girls in overweight (20.4% and 20.7%, p=0.84) and obesity (6.5% and 7.5%, p= 0.39).

In the control group, the proportion of overweight and obesity was been respectively 15.5% and 4.5% without significant difference between sex neither in overweight (p=0.59) nor in obesity (p=0.49) (table 1). The prevalence of overweight and obesity was been significantly different between the two groups (p<10-3).

In the intervention group, only 19.1% of schoolchildren reported practicing physical activity daily. This proportion was been different between boys and girls with 29.7% and 8.4% respectively (p<10-3). In control group, 12.7% of schoolchildren reported doing physical activity daily with 23.1% and 3.7% respectively among boys and girls. The proportion of schoolchildren who practice physical activity in the intervention group was significantly higher than the control group (p<10-3).

We explored sedentary activities among schoolchildren by the evaluation of screen time and homework time spent in weekday and in weekend. Table 1 present that sedentary time is more important in the weekend. The proportion of schoolchildren who spend more than two hours of screen time per day in a weekday or in the weekend is significantly higher in the control group. The mean of homework time in a weekday is significantly higher in intervention group with 2.53 ± 1.84 hours/day versus 2.17 ±1.56 (p<10-3). However, this mean wasn't different in weekend with 2.69 ±178 hours/day and 2.78± 1.75 hours/day respectively in intervention and control group (p=0.12).

Concerning eating habits, the schoolchildren reported frequency (number of days per week) of consuming various foods and beverages included respectively in the intervention and control group: vegetables 3.9 days/week and 4.81 days/week, fruits 5.41 days/week and 5.7 days/week, high fat food 2.49 days/week and 2.48 days/week, sweetened beverage 3.84 days/week and 3.3 days/week, sweets 4.33 days/week and 4.57 days/week. All these habits were different between intervention and control group except high fat food consumption (p=0.8).

We also evaluated smoking habits among schoolchildren. The proportion of daily smokers was been 1.1% and 0.1% respectively among boys and girls in the intervention group. This proportion was been 3.2% among boys in control group and no girl smoked daily in this group. The proportion of irregular smokers was been respectively 6.8% and 2.2% among boys and girls in the intervention group and 11.3% and 0.9% in control group. The proportion of daily smokers was been significantly higher among boys in the control group and higher among girls in the intervention group.

DISCUSSION

In summary, this paper described the background and rationale; study design, measurement procedures, intervention components, process evaluation procedures and baseline results of the project "together in health" in school setting.

The baseline results indicate an important proportion of overweight and obesity, low physical activity, excessive screen time and of tobacco use beginning at early age.

This study has some limits. First, there weren't randomization between the two groups, that's why some important variables like tobacco use were significantly different. For this, after the intervention, we will compare pre post results in each group separately.

Second, lifestyle risk factors were self-reported. Studies have shown that self reports tend to underestimate smoking status [13] and overestimate physical activity levels [14,15]. Surveys using food frequency questionnaires reported mixed situations of overestimating as well as underestimating of food and nutrient intakes [16]. Self-

Table 1: Smoking, diet and exercise habits of intervention and control groups

	Control schools			Intervention schools		
	Males n=965	Females n= 1109	Total n= 2074	Males n=968	Females n= 961	Total n= 1929
Age (yrs)	13.54 (1.32)	13.42 (1.27)	13.48 (1.29)	13.25 (1.26)	13.23 (1.25)	13.24 (1.25)
BMI*						
% Normal weight	80.1%	79.9%	80.0%	73.1%	71.8%	72.4%
% Overweight	15.0%	15.9%	15.5%	20.4%	20.7%	20.6%
% Obese	4.9%	4.2%	4.5%	6.5%	7.5%	7.0%
Self reported physical activity						
% reporting 5days/week *	51.8%	14.0%	31.6%	57.4%	24.9%	41.3%
% reporting 7 days/week *	23.1%	3.7%	12.7%	29.7%	8.4%	19.1%
Screen time						
% 2 hrs/d screen time weekday *	55.3%	60.4%	58.0%	57.3%	50.6%	54.0%
% 2 hrs/d screen time weekend *	76.1%	83.9%	80.3%	77.2%	78.2%	77.7%
Homework time						
Homework time weekday (hrs/d) *	1.94 (1.53)	2.37 (1.57)	2.17 (1.56)	2.37 (1.87)	2.68 (1.79)	2.53 (1.84)
Homework time weekend (hrs/d)	2.32 (1.66)	3.19 (1.72)	2.78 (1.75)	2.40 (1.78)	2.98 (1.73)	2.69 (1.78)
Diet						
Whole grain (d/wk) *	3.93 (2.31)	3.17 (2.37)	3.52 (2.37)	3.59 (2.51)	2.95 (2.46)	3.27 (2.50)
High fat food (d/wk)	2.72 (2.05)	2.27 (1.85)	2.48 (1.96)	2.52 (2.18)	2.45 (2.16)	2.49 (2.17)
Vegetables (d/wk) *	4.81 (2.26)	4.81 (2.24)	4.81 (2.25)	3.96 (2.37)	3.83 (2.54)	3.90 (2.46)
Fruits (d/wk) *	5.71 (1.79)	5.70 (1.88)	5.70 (1.84)	5.28 (2.19)	5.53 (2.11)	5.41 (2.16)
Sweets (d/wk) *	4.43 (2.38)	4.69 (2.33)	4.57 (2.36)	4.06 (2.46)	4.59 (2.44)	4.33 (2.47)
Beans (d/wk) *	3.67 (2.27)	3.33 (2.37)	3.49 (2.33)	2.97 (2.18)	2.64 (2.16)	2.81 (2.17)
Sweetened beverage (d/wk) *	3.42 (2.16)	3.19 (2.13)	3.30 (2.15)	3.83 (2.38)	3.85 (2.42)	3.84 (2.40)
Tobacco use*						
% Daily smoker	3.2%	0%	1.5%	1.1%	0.1%	0.6%
% Irregular smoker	11.3%	0.9%	5.7%	6.8%	2.2%	4.5%
% Non smoker	85.5%	99.1%	92.8%	92.1%	97.7%	94.9%

* Significant difference between intervention and control groups.

reported data were potentially subject to information bias when the primary concern was the absolute level of lifestyle risk factors. However, when the main purpose was to rank and categorize subjects according to their relative level (as in this study), self-reported data were shown to have reasonable validity with the benefit of greater accessibility in large epidemiological studies [17,18].

There are many challenges in executing and evaluating the effects of comprehensive school and community based interventions in developing countries. In Tunisia, a school based intervention to promote healthy lifestyle implemented in two intervention schools during a school year demonstrated essentially an improvement of knowledge and intention of schoolchildren concerning the chronic disease risk factors [19]. In fact, behavior change requires a longer period of intervention [20,21] and parent implication in a school based intervention or in better case in a community based intervention.

For this reason, we implemented the project "together in health", where school based intervention is included in a community intervention and will last three years. This is also the case of several international studies which demonstrated the efficacy of their intervention [22,23]. Also, parental involvement could be an integral part of the school based intervention [24,25]. Another important determinant of the effectiveness of these interventions is partnership and collaboration with different actors [25, 26]. Public health staff should work in collaboration with teachers, schools and school boards to lobby local and provincial policy makers to increase resources for the promotion of healthy lifestyle within the school system [24, 25].

Multi-component foods, physical education, class curricula, behavioral knowledge and skills, communications and social marketing, and the acceptability of healthy behavior have been proposed as means of reducing chronic disease risk factors. However, the efficacy observed has been inconsistent [25, 27].

The challenge is to identify and to develop a cohesive hypothesis which combines educational and health promotion, to examine the effects of the intervention with valid and reliable measurements of the outcomes.

In our project, we tried to follow these recommendations by the implication of multiple partners who will help us to implement our intervention. Class curricula, behavioral knowledge and physical education will be done with collaboration with teachers. Behavioral skills and social marketing is planned to be implemented with trained leaders.

CONCLUSION

Integrated and sustainable interventions against non communicable disease risk factors in this region are needed to prevent these diseases early in childhood.

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