

# CONSUMPTION OF FRUITS AND VEGETABLES AMONG SECONDARY SCHOOL STUDENTS FROM CLUJ COUNTY

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## Abstract

**BACKGROUND:** Due to their beneficial effects on health, World Health Organization recommends a daily minimum intake of fruits and vegetables of 400 g, representing 5 servings per day (each serving containing around 80 g).

**AIMS:** The present study focuses on the consumption of fruits and vegetables among secondary school children from both urban and rural areas from Cluj county (Romania). It has two objectives. The first one is to evaluate the frequency and quantity for fruit and vegetables consumption among the study sample, while the second objective is to explore several factors which influence them.

**MATERIAL AND METHODS:** A cross sectional study was performed through means of anonymous questionnaires among 187 school students aged 11-15 from the fifth to eight grades from Cluj-Napoca and Cuzdrioara.

**RESULTS:** It shows that only half of the study sample consumes fruits daily and one third consume vegetables daily. Moreover, the majority eat less than 5 portions of fruits and vegetables daily, with almost half eating less than two portions daily. No differences were found based on age, gender or residence with regard to this issue. The results of the bivariate correlations showed that consumption of more portions of fruits and vegetables per day was positively associated with the level of knowledge, as well as with eating more frequently fruits and vegetables during one week.

**CONCLUSIONS:** These results underline the need for educational activities targeting school children in order to promote consumption of fruits and vegetables.

**KEYWORDS:** **fruits and vegetables consumption, Romanian children, rural and urban areas, promotion of healthy nutrition**

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## INTRODUCTION

Promoting of a healthy nutrition among school children has important short term as long as long term consequences on their health, life quality and socio-economical development [1,2,3]. The principles of a healthy nutrition includes consumption of appropriate quantities of fruits and vegetables, meat or other sources of proteins, dairy products, avoiding of consumption in excess of foods high in energy, fat,

sugar, salt, consumption of breakfast, lunch and dinner and avoiding of unhealthy snacks [4,5].

World Health Organization recommends a daily minimum intake of fruits and vegetables of 400 g, representing 5 servings per day (each serving containing around 80 g). Moreover, the recommendations stress the importance of consuming both fruits and vegetables daily, preferably at least 2 portions of fruits and 3 portions of vegetables per day [5].

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The study Health behavior in school aged children performed among school children aged 11,13, 15 years in 2014 in several European countries including Romania is presenting the following results: consumption of fruits every day was 49% among girls and 43% among boys 11 years old ( European mean was 47%, respectively 41%), 43% among girls, respectively 35% among boys 13 years old (European mean 40%, respectively 34%), 32% among girls, respectively 25% among boys 15 years old (European mean 37%, respectively 29%) [6].

A study performed in Romania among school children aged 11-14 year old from one big town of Romania (Cluj-Napoca) in 2011 showed that 47.1% of children declared they ate fruits daily. The recommendations of eating at least two portions of fruits every day were met by 44.6% of the students. A percentage of 29.1% of the students eat even less than one portion of fruits daily. Consumption of vegetables every day was declared by 39.6% of children. Only 9.1% of the students met the recommendations of eating at least three portions of vegetables every day. Moreover 74.5% of the students eat less than two portions of vegetables daily, while around half of them eat even less than one portion per day [7].

The factors which influence the consumption of fruits and vegetables are varied and might include socio-demographic and cultural issues such age, gender, place of residence [7-9]. Nevertheless, in Romania there are limited information with regard to consumption of fruits and vegetables and factors which influence this behavior among school children from urban and especially rural areas.

## OBJECTIVES

The present study focuses on the consumption of fruits and vegetables among school children from both urban and rural areas from Cluj county in Romania. It has two objectives. The first one is to evaluate the frequency and quantity for fruit and vegetable consumption among the study sample, while the second objective is to explore several factors which influence them.

## MATERIAL AND METHODS

Sample and procedure for data collection

A cross-sectional study was conducted in May 2014 in three secondary schools from Cluj

county – 2 schools from an urban area (Cluj-Napoca) and one school from an rural area (Cuzdrioara); Ethical approval for the study was obtained from the directorate of each school.

In each school the study was performed in one class per each grade and all pupils that were present in these selected classes in the day of the survey were asked to participate. The study involved 187 school students aged 11-15 from the fifth to eight grade. The sample included 124 children from Cluj-Napoca (48.4% boys and 51.6% girls) and 63 from Cuzdrioara (60.3% girls and 39.7% boys).

All study subjects were asked to fill in an anonymous questionnaire which assessed several health risk behaviors. Questionnaires were distributed by members of the research team during school activity and students were informed that the participation is voluntary. No refusal was recorded.

The present study is including the following issues:

- Socio-demographic characteristics (age, gender, residence)
- Frequency of consumption of fruits and vegetables
- Students were asked how frequent they eat fruits, respectively vegetables with possibilities of answers ranging from less than weekly to every day.
- Number of portions of fruits and vegetables consumed per day in the last week. Students were asked how many days they were eating fruits and vegetables in the last week, respectively how many portions of fruits and vegetables they were eating in these days; a portion of fruit or vegetable was defined as one medium fruit or one half cup of fruits or vegetables or one cup of raw leafy vegetables (e.g. lettuce), or three-fourths of a cup of vegetable or fruit juice.
- Based on the results the medium number of portions of fruits and vegetables consumed per day was calculated.
- Knowledge regarding the number of portions of fruits and vegetables they should consume per day
- Opinions regarding the quantity of fruits and vegetables they eat (enough, too little,

too much, don't know) and intention regarding the consumption of fruits and vegetables in the next month (the same quantity, more, less, don't know)

### Statistical analyses

The medium number of portions of fruits and vegetables was calculated multiplying the number of days/week when they consumed fruits and vegetables with the number of portions/day and divided by 7.

Prevalence of the investigated behaviors was assessed. The knowledge, opinions and intention regarding the consumption of fruits and vegetables were estimated for three groups: students eating less than 2 portions/day, those who eat 2-4 portions per day and those who eat more than 4 portions per day.

Bivariate correlation was used in order to estimate the association between frequency of consuming fruits, frequency of consuming vegetables, number of portions of fruits and vegetables consumed per day and socio-demographic characteristics (age, gender, residence) as well as the level of knowledge regarding the number of portions of fruits and vegetables which should be consumed.

Data analysis was performed with the SPSS-20.0 statistics programme. Significant results are reported at  $p < 0.05$

## RESULTS

Table 1 shows that around one third of school children eat vegetables every day, but almost three quarters declared consumption at least 3 times/ week. With regard to fruits consumption, almost half of them eat fruits daily and the majority eats fruits at least three times per week.

The medium number of portions of fruits and vegetables consumed per day was less than 2 for 49.2%, between 2 and for 43.3%, while only 7.5% eat more than 4 portions daily.

Frequency	Vegetable consumption %	Fruit consumption %
Less than once/week	4.8	3.7
1-2 times/week	21.9	13.9
3-4 times/week	19.8	17.1
5-6 times/week	17.6	18.2
Every day	35.9	47.1

Table 1. Frequency of consumption of fruits and vegetables

As presented in Table 2 among the children who eat less than 2 portions one of five children think they should eat only one portion and around 63% think they should eat 2-3 portions, while 7.6% admit they do not know. Nevertheless, around 60% believe they eat enough and only 30% plan to eat more in the next month.

Among those who eat between 2 and 4 portions around two thirds think they should eat 2-3 portions per day, while 18.5% declare that they do not know. Two third think they eat enough and only 37% makes plans to eat more.

Half of the children who eat more than 4 portions per day declared that the number of portions of fruits of vegetables which should be eaten daily is 4-5 and 14.3% said they do not know. Around 42% think they eat enough and half of them intend to eat more in the future.

	Children eating <2 portions of fruits and vegetables/day N=92 %	Children eating 2-4 portions of fruits and vegetables/day N=81 %	Children eating >4 portions of fruits and vegetables/day N=14 %
<b>Knowledge<sup>1</sup></b>			
1 portion	21.7	8.6	7.1
2 portions	44.6	42	14.3
3 portions	18.5	22.2	14.3
4 portions	3.3	14.8	35.7
5 portions	4.3	1.2	14.3
I do not know	7.6	18.5	14.3

	Children eating <2 portions of fruits and vegetables/day N=92 %	Children eating 2-4 portions of fruits and vegetables/day N=81 %	Children eating >4 portions of fruits and vegetables/day N=14 %
<b>Opinions<sup>2</sup></b>			
Enough	60.9	65.4	42.3
Too little	21.7	14.8	14.3
Too much	0	1.2	14.3
I do not know	17.4	18.5	28.6
<b>Intention<sup>3</sup></b>			
Less	13.0	8.6	0
The same	57.6	54.3	50
More	29.4	37	50

Table 2. Knowledge, opinions and intention regarding the consumption of fruits and vegetables

<sup>1</sup>Knowledge regarding the quantity of fruits and vegetables which should be consumed every day

<sup>2</sup>Opinions regarding the quantity of fruits and vegetables they consumed in the last week

<sup>3</sup>Intention regarding the quantity of fruits and vegetables they intend to consume in the next month

Table 3 presents that the frequency of eating fruits and vegetables did not vary according with age, gender, residence or the level of knowledge regarding the number of portions of fruits and vegetables which should be consumed daily. Children who eat more frequently fruits have the tendency to eat more frequently also vegetables.

On the other hand no age, gender or residence differences was found with regard to the medium number of portions of fruits and vegetables consumed per day, but children who consumed more frequently fruits, vegetables and had better knowledge regarding the number of portions of fruits and vegetables which should be consumed daily had a higher consume of these products.

	Frequency of vegetable consumption	Frequency of fruit consumption	Portions of fruits and vegetables/day
<b>Frequency of fruit consumption</b>	0.621		
<b>Portions of fruits and vegetables/day</b>	0.325	0.389	
<b>Age</b>	NS	NS	NS
<b>Gender</b>	NS	NS	NS
<b>Residence (rural-urban)</b>	NS	NS	NS
<b>Knowledge regarding the number of portions and vegetables which should be consumed/day</b>	NS	NS	0.252

Table 3. Factors associated with fruits and vegetables consumption-results of bivariate correlations  
NS=non-significant

## DISCUSSIONS

Consumption of fruits and vegetables offer the presence in the diet of dietary fibres, several vitamins,

minerals and phytonutrients, contributing to prevention of several chronic diseases and forms of malnutrition. Nevertheless, studies from different countries, including Romania underline the fact that several

population groups do not eat 5 portions of fruits and vegetables daily as recommended by World Health Organizations [6,7,10-12].

Our study focused on fruit and vegetable consumption among 11-15 years old children from Cluj-Napoca and one rural area-Cuzdrioara. It shows that only half of the study sample consume fruits daily and one third consume vegetables daily. A study previously performed among 11-15 years old school children from Cluj-Napoca showed similar results [7].

Moreover, the majority eat less than 5 portions of fruits and vegetables daily, with almost half eating less than two portions daily. No differences were found based on age, gender or residence with regard to this issue. This is not surprising since many children recognize that they do not know how many portions of fruits and vegetables they should eat or offered wrong answers, with the majority thinking that the recommended quantity is between 1-3 portions/day. The results of the bivariate correlations showed consumption of more portions of fruits and vegetables was positively associated with the level of knowledge, as well as with eating more frequently fruits and vegetables during one week.

Despite the insufficient consumption, only one out of three children makes plans to eat more in the next month.

This study is subject of several limitations-inclusion of a limited sample of children which limits the generalization of results, as well as the power of the statistical analyses. The assessment of the consumption of fruits and vegetables through food frequency questionnaires might include several biases including both over and underestimation.

## CONCLUSIONS

These results underline the need for educational activities targeting school children both from urban and rural areas of Romania in order to inform, motivate and equip them with skills which will help them to eat more fruits and vegetables, as an important part of promotion of healthy nutrition. At the same time schools and parents should cooperate in creating environments which encourage the consumption of fruits and vegetables among children. Future health promotion activities in this field should take advantages of

educational materials, activities and recommendations developed by previous educational programs [13-16].

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