

Socioeconomic characteristics and fruit/vegetable intakes among scholar children in the oasis of Tafilalet, Southeastern Morocco

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ABSTRACT

Introduction: Fruits and vegetable were globally promoted as healthy food. It was proved that high consumption of fruit and vegetable reduced the risk of noncommunicable diseases, especially cardiovascular diseases, type 2 diabetes, obesity and cancer. The purpose of this study was to describe fruit and vegetable intake and its relation with socioeconomic status in Moroccan school aged children

Methods: Data were collected by a cross-sectional study of a sample of children from primary government schools in southeastern Morocco. A 24 hours dietary recall of the children's food intake questionnaire was realized.

Results: Results showed a strong association between fruit and vegetable and tested variables. Higher fruit and vegetable intakes were associated with lower level of education of mothers. Concerning monthly family income category, no significant correlation was detected. Mean vegetables consumption were related significantly with Household location, Ethnicity and age groups ($p=0.000$, $p=0.000$ and $p=0.001$ respectively).

Conclusion: Socioeconomic inequalities influence fruit and vegetable intakes. Consequently, socioeconomic status must be considered in promoting health and improving diet.

KEYWORDS

Fruit, Vegetable, Socioeconomic status, Children, Morocco.

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INTRODUCTION

Fruit and vegetables are very important in human alimentation; they represent essential source of nutrients. many prospective studies examined specifically some intake of fruits and vegetables such as antioxidants, fiber, vitamins and minerals proved their Health Benefits. Low consumption of fruit and vegetable has been established as a major risk factor of all causes of human mortality¹⁻². In addition, high fruit and vegetable intakes was associated with reduced risk and prevention of several diseases such as cardiovascular and coronary heart disease, hypertension, stroke, cancer and even hip fracture³⁻⁴⁻⁵⁻⁶.

Socioeconomic characteristics such as level of education, income, and ethnicity directly influence health and well-being of a population. In a Japanese study on adults, socioeconomic inequalities were proven as a social determinant of health and more specifically with eating behaviors⁷⁻⁸.

In Morocco, the relation between fruit /vegetable intake and socioeconomic status was poorly investigated due to a lack of data and research. In order to fill this gap, the current study helps to assess fruit and vegetables consumption of school-aged children their household socioeconomic characteristics in both urban and rural areas in the oasis of Tafilalet in the southeastern region of Morocco.

SUBJECTS AND DATA COLLECTION

This study consists of a cross-sectional survey with completed questionnaires from 3 684 scholars randomly selected from 39 primary public schools covering three Moroccan provinces. It was performed from 5 May 2015 to 11 November 2017. The sample was produced to represent 1% of the target population, which belongs to this age group. Before conducting this study, authorizations were given by

the regional and local education authorities and express consent of tutors. The questionnaire contained two parts. The first part designated for information regarding socioeconomic status (SES). This section included information such as age, household location, occupation, gender, and ethnicity of mother's children (we considered Arab people who speak Arabic language and Amazigh people who speak Tamazight language), family size, school period, number of household members, type of family, maternal education, paternal education, monthly family income (MFI). The second part focused on tracking the children's diet for a 24-hour period. (The tracking method, called a 24-hour recall, is a type of nutritional assessment based on collecting diet information and quantifying food intake for a full day.) In this assessment, children were specifically asked what and how much they ate in the 24-hour period before the interview. All information linked to vegetable and fruit consumption were obtained. For documentation of quantity or size of food, we introduced measuring instruments, such as cups, bowls, and different sized spoons and used pictures to help children quantify the amount they ate or drank. Portion sizes eaten were evaluated and weighed to quantify each child's intake. Twenty-eight questionnaires were excluded from the data analysis due to incomplete answers in parts of the questionnaire. After an internal quality control check and thorough review for data entry errors the final sample concluded with 3 684 children (1 890 girls and 1 794 boys).

DATA ANALYSIS

Data were coding, checked, entered and statistically analyzed by free statistical software. Descriptive analyses were carried out, expressed as mean±standard deviation for numerical variables and number or percentage for categorical variables. Statistical Tests used to determine associations between all factors studied (χ^2 test (Chi square) for categorical data and ANOVA test (analysis of variance) for means and quantitative data). Level of significance was fixed in 0.05, associations with p value less than 0.05 were considered statistically significant.

RESULTS

Socioeconomic characteristics

The socioeconomic characteristics in children are shown in table 1. The average age sampling was 9.81 ± 2.13 years. 45.3%, 45.0 % and 9.8% belong to those age classes respectively 5-9 years, 10-12 years and above or equal to 13 years. 51.3% were girls and 48.7 % were boys. Concerning the place of residence, 62.7 % were from urban areas versus 37.3% in rural areas. Regarding levels of education in parents, 38.6 % of mothers were illiterate against 22.9 % of fathers. Indeed this percentage of illiterate mothers was the highest one followed by primary level of education (36.3%), but only 7.3 % that continue their studies until the university.

Table 1. Socioeconomic characteristics in scholar children (N = 3 684).

Characteristics	%	n
Age (years)		
5-9	45.3	1668
10-12	45.0	1656
≥ 13	9.8	360
Household location		
Urban	62.7	2309
Rural	37.3	1375
Occupation		
Employed	32.6	1200
Unemployed	67.4	2484
Gender		
Male	48.7	1794
Female	51.3	1890
Ethnicity		
Arab	33.3	1228
Amazigh	66.7	2456
Number of household members		
3 à 4 members (small family)	15.7	577
5 à 6 members (average family)	49.3	1815
≥ 7 members (large family)	35.1	1292
School period		
Morning	8.6	317
Afternoon	12.1	444
Full-time	79.3	2932
Type of family		
Nuclear	82.4	3037
Joint	17.6	647
Maternal education		
University	7.3	269
Secondary	17.8	655
Primary	36.3	1339
Illiterate	38.6	1421

* 1\$US=9.36MAD.

Table 1 continuation. Socioeconomic characteristics in scholar children (N = 3 684).

Characteristics	%	n
Paternal education		
University	21.0	773
Secondary	26.6	980
Primary	30.5	1123
Illiterate	21.9	808
MFI		
Low ($\leq 2\ 000$ MAD*)	17.4	640
Medium (2 001-4 999 MAD)	66.1	2434
High ($\geq 5\ 000$ MAD)	16.6	610

* 1\$US=9.36MAD.

For father's occupation, more than half of population were not employed (67.4%), 85.99 % of the mothers were housewives, adding that 84.4% of household lived in medium to broad family with a mean of 6.4 ± 2.63 person/household, 82.4% of the population lived in nuclear family. The proportion of monthly household income between 2 001–4 999 Dirhams seemed to be higher in the whole sample (66.1%). For ethnicity, 33.3 % were Arab and 66.7% are Amazigh. Regarding school time, 79.3% of scholars studied all day.

Vegetable and fruit consumption and socioeconomic variables

The consumption of vegetable and fruit and the socioeconomic characteristics were described in Table 2. Mean fruit consumption was higher than vegetable, between 179.48 (66.04) and 198.55 (64.48) g/day, 145.37 (36.60) and 161.33 (39.03) g/day respectively. Children aged above or equal to 13 years olds had higher mean fruit and vegetable intakes than 5- to 9 and 10- to 12 years old, this association was statistically significant for vegetables ($p=0.001$). Vegetable intakes were significantly higher among rural children comparing with resided in urban areas ($p<0.001$). Concerning sex differences, girls were more likely to have a high vegetable intake but there is no significant correlation detected. Regarding school period, children having school in the afternoon consumed significantly more vegetable. The same finding was shown for children how speaks Arab language. Total vegetable consumption differed significantly among ethnicity and paternal/maternal education ($p=0.000$, $p=0.048$, $p=0.010$ respectively); however, total fruit and vegetable intakes were not significantly different household incomes. Even differences observed in fruit daily intake no significant

Table 2. Correlation between fruit and vegetable intakes and socioeconomic variables in children (N=3 684).

Characteristics	Vegetable intake M(SD)/ (g/day)	Fruit intake M(SD)/ (g/day)
Age (years)		
5-9	149.67 (34.43)	184.59 (65.11)
10-12	150.17 (37.09)	187.61 (66.82)
≥ 13	161.33 (39.03)	198.55 (64.48)
Household location		
Urban	146.70 (36.34)	184.90 (65.66)
Rural	157.79 (35.31)	190.85 (66.19)
Occupation		
Employed	148.06 (37.17)	185.20 (67.82)
Unemployed	152.22 (35.91)	188.25 (64.85)
Gender		
Male	149.41 (36.11)	187.13 (65.63)
Female	152.59 (36.44)	187.22 (66.22)
Ethnicity		
Arab	160.25 (37.25)	191.92 (70.45)
Amazigh	146.39 (34.93)	185.23 (63.86)
Number of household members		
3 à 4 members (small family)	148.69 (36.03)	191.63 (69.35)
5 à 6 members (average family)	151.65 (36.13)	185.27 (64.77)
≥ 7 members (large family)	151.30 (36.67)	187.92 (65.93)
School period		
Morning	151.23 (33.99)	187.43 (66.37)
Afternoon	157.70 (32.98)	183.70 (65.23)
Full-time	150.06 (36.90)	187.57 (56.99)
Type of family		
Nuclear	151.69 (36.28)	187.74 (66.33)
Joint	148.18 (36.35)	184.10 (93.56)

M : Mean ; SD : Standard Deviation.

Table 2 continuation. Correlation between fruit and vegetable intakes and socioeconomic variables in children (N=3 684).

Characteristics	Vegetable intake M(SD)/ (g/day)	Fruit intake M(SD)/ (g/day)
Maternal education		
University	145.37 (36.60)	185.21 (63.74)
Secondary	146.53 (36.41)	182.26 (66.16)
Primary	154.34 (37.85)	189.61(66.54)
Illiterate	150.85 (34.55)	187.78 (65.62)
Paternal education		
University	146.35 (37.24)	182.42 (63.97)
Secondary	151.00 (36.69)	186.26 (67.40)
Primary	153.81 (36.63)	188.53 (65.34)
Illiterate	150.81 (34.30)	192.36 (66.93)
MFI		
Low ($\leq 2\ 000$ MAD*)	147.86 (35.17)	191.59 (65.68)
Medium (2 001- 4 999 MAD)	152.47 (36.54)	188.03 (65.84)
High ($\geq 5\ 000$ MAD)	148.66 (36.44)	179.48 (66.04)

M : Mean ; SD : Standard Deviation.

association was detected between fruit consumption and socioeconomic characteristics.

DISCUSSION

The present study evaluated socioeconomic factors associated with high consumption of fruits and vegetables in a population of school-aged children those belong to urban and rural areas of the oasis of Tafilalet in the southeastern of Morocco. Daily consumption of vegetables and fruits was detected, these finding suggest that the study site may have healthy food habits. Several studies mention socioeconomic status as an important factor that directly influence the state of health and well-being including the quality of life⁸⁻⁹. The findings showed strong correlations between daily intake of fruit/vegetables and socioeconomic characteristics, especially age categories, household location, ethnicity and maternal education. Children from rural areas were more likely to have high consumption of vegetables and fruit comparing with urban children. These results were in discordance with several studies¹⁰⁻¹¹⁻¹². In our case, rural places were characterized by

a predominance of food crops; consequently, the majority of children consume fruits and vegetables. In fact, environmental factors were determinant in fruit and vegetable consumption.

Mean intake of fruits and vegetables per day was more important in children with mother having lower level of education contrary to others research^{13,12} that associated higher consumption to higher instruction. Our finding can be explain by the fact of time spent with children, high educational levels lead to be more employed mothers and that can influence the time sacrificed for taking care of alimentation of children. For ethnicity, several research indicated differences by race/ethnicity, origin and language preference¹⁴⁻¹⁵. In the current study, children who speaks Arab language consumed more vegetable and fruit that may reflect good food habit among this target of studied population. Our results suggest that the main daily intake of vegetables increased significantly according to the age group of the children. The same data was observed among Children in School Canteens¹⁶. Indeed, the age constituted as an important variable that influenced children's consumption. No significant difference in fruit and vegetable consumption was found according to monthly family incomes, whereas Baars AE and colleagues, in 2019, reported that children living in families with high incomes had higher fruit and vegetable intakes.

CONCLUSION

The present study analyzed the impact of socioeconomic status on daily fruit and vegetable intakes among school-children in the Tafilalet region in southeastern Morocco. The infantile oasis population was characterized by an important consumption of vegetables and fruits. Ethnicity and educational level of the parents as well as degree of urbanization influence consumption of vegetables and fruits.

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