

Table 1. Characteristics and main results of the cross-sectional studies included.

Authors / Year / Country	Sample Characteristics	Age Mean or Range	Response Rate	Anthropometric Measurement	Frequency of Family Meals (FFM) Measurement	Control Variables	Risk of overweight	Main Limitations
Veugelers et al. 2005 Canada	4298 children (49% males) from 282 Schools of Nova Scotia	10-11	51.1%	Measured weight and height. Overweight based on BMI international standards criteria for age and sex (Cole et al., 2000).	Self-reported by Harvard's Youth/Adolescent Food Frequency Questionnaire. Frequency of family supper: <once a week, 1-2,3-4 and ≥5 times a week	Gender, lunch habits, participation in physical activities, parental education, neighborhood income, frequency of physical education classes	Reporting eating supper with family ≥ 3 times a week vs. reporting less than once a week. OR 0.68 (95% CI 0.52-0.88)	Low response rate
Mamun et al. 2005 Australia	2325 adolescents (52% males) from a longitudinal study of women and their offspring in Brisbane: 91% white, 5% aboriginal-islander,	14	53% (61% of them have complete data on all control variables)	Measured weight and height. Overweight based on BMI international standards	Mothers reported by questionnaire How often does your family eat together? at least once a day, a few times a week and	Race, age, gender, being overweight at 5 y of age, maternal parity, gross family income, maternal education, maternal attitude toward child's consumption of fatty	Reporting family meals at least once a day vs. a few times/ once/less than once a week OR: 1.05	Mothers reported FFM Low response rate Adolescents who did not participate were

	and 4% Asian			criteria for age and sex (Cole et al., 2000)	about once or less than once a week	foods , frequency of fast food,/soft drinks and red meat, hours of TV-watching per day and days spent on sports per week.	(NS*)	from lower SEP, and mothers were more likely to have had low education and to be non-white.
Utter et al. 2008 New Zealand	3245 adolescents (48% males) from 6 Schools of the Pacific Obesity Prevention in Communities study (OPIC): 63% Pacific Island, 19% Maori, 11% Asian /other, 8%European	14.8	62% (96% of them had complete survey data about nutrition and physical measurements)	Measured weight and height	Self-reported by questionnaire In the last 5 school days, how many times did all or most of your family living in your house ate an evening meal together? none, 1-2, 3-4 and everyday	Gender and age	NS* inverse association between FFM and BMI	Non-representative sample of adolescents from an economically disadvantaged area Not controlled by SEP, diet, and physical activity related variables
Yuasa et al. 2008 Japan	3291 (50% males) school children from 1 st and 4 th grade of Elementary School and 1 st grade of Junior High-school	6 / 9 / 12 (according to school grades	99%	Self- and parent- reported weight and height Obesity defined as > 120% of the Tokushima	Parents reported for Elementary school children, and self-reported for Junior High children by questionnaire Do you eat together	School grade	NS* inverse association between FFM and prevalence of obesity.	Self-report or parents reported anthropometric data Not controlled by SEP, diet, and physical activity

	from 127 randomly selected schools from Tokushima Prefecture.)		standard weight for sex and height data (2000)	as a family, at least once a day? almost every day (6-7) and not every day (0-5 times a week)			related variables (which were collected)
Woodruff et al. 2009 Canada	3223 students (48% males) from 6 th , 7 th and 8 th grade from 86 schools in Northern Ontario, Southern Ontario and Nova Scotia	10-14 (according to school grades)	51.2 %	Self-reported weight and height Overweight based on BMI CDC standards for age and sex (BMI cut-off points were not described).	Self-reported by a Web-based Food Behavior questionnaire Typically, How many days per week do you eat dinner or supper with at least one parent? 0-7 days a week.	Gender, school grade, fast food frequency, pop drinks consumption, having breakfast, dieting, concern of high weight, self efficacy for healthy eating: at home, at school with friends, during social events and when alone.	OR 1.00 for overweight and OR 1.08 (NS*) for obesity, for each additional dinner or supper eaten in family	Self-reported anthropometric data. Low response rate Not controlled by SEP and physical activity related variables
Fulkerson et al. 2009 USA	139 adolescents (51% males) from 4 Alternative High Schools in Minnesota: 40% white, 31% black/ African American, and 29% Hispanic /	17.2	36 % (96% of them have complete data on all control variables)	Measured weight and height Overweight: BMI \geq 85 th percentile based on CDC standards for	Self-reported by questionnaire. During the PAST WEEK, how many days did all or most people you live with, dinner together? Never, 1-	Race, gender, random effect of school, and socioeconomic position	Reporting dinner in family 5-7 times a week vs. never OR 0.36 (CI 95% 0.14-	Low response rate Small and atypical sample of adolescents at risk of academic failure

	other			age and sex	4 times a week or 5-7 times a week		0.91)	Not controlled by diet and physical activity related variables
Rollins et al. 2010 USA	16770 children (52% males) from the National Child Health Survey 2003: 79% non-Hispanic white, 11% non-Hispanic black and 10% Hispanic	6-11	90%	Weight and height reported by parents Overweight: BMI \geq 85 th percentile based on CDC standards for age and sex	Mothers reported by telephone interview During the past week, how many days did all the family members who lived in the household eat a meal together? : 0-2, 3-4, 5-6 days a week and everyday	Gender, age, poverty level, household educational level, family structure (two/single parent)	Having a meal with all the family 5-6 days a week vs. 0-2 days a week OR 0.67 (95% CI 0.52-0.87) only for obesity in non-Hispanic whites	Parents reported anthropometric and FFM data Not controlled by diet and physical activity related variables
Anderson et al. 2010 USA	8550 pre-school children (51% males) from a national representative sample: 54% non-Hispanic white, 15% non-Hispanic	4	97%	Measured weight and height. Overweight based on BMI international standards criteria for age	Mothers reported by interview In a typical week, how many days at least some of the family eat the evening meal together? 1-7 days a	Race, gender, age, household income poverty ratio, single-parent household, maternal education/BMI/age, obtaining \geq 10.5 hrs sleep per weeknight,	Having the routine of eating 6-7 times per week vs. lack of routine. OR 0.77 (95%CI 0.65-	Mothers reported FFM Not controlled by diet and physical activity related variables

	black, 24% Hispanic, 6% Other			and sex (Cole et al., 2000)	week	limiting screen-viewing time (TV, videos, DVD) to ≤ 2 h per weekday	0.92) for obesity	
Goldfield et al. 2011 Canada	1764 (41% males) adolescents from Middle and High Schools from Ottawa: 50% North-American, 25% European, 9% Asian, 14% other.	14.1	99%	Measured weight and height	Self-reported by Attitudes and Patterns of Eating (APE) questionnaire Do you eat regular meals with your family at home, sitting at the table together? Never to few times a year, once or several times a month, once or several times a week, once a day and 2 or more times a day	Gender, age, parental education, frequency of snack-food.	FFM was inversely associated with BMI only in females ($\beta^\dagger=-0.320$; $p=0.001$)	Not representative sample of adolescents from highly educated families Not controlled by race and leisure time physical activity (data collected)
Lee et al. 2011	261 children (52% males) from 2 nd and 3 rd grades	7-9	87%	Measured weight and height	Parents or guardians reported by questionnaire	Gender, age, mother's education, mother's BMI, parental diabetes	Reporting eating with their family 1	Parents reported FFM Small and not

Korea	of an Elementary School in Seoul			Obesity: BMI \geq 95 th and Overweight \geq 85 th percentile based on the Korean Children and Adolescents Growth Standards (2007)	Frequency of Family meals (lack of detailed information about the specific question asked): 1/day, 4-6/week, 1-3 /week and 2-3/month		meal per day versus less than 3 meals per month. OR 0.11 (95% CI 0.01-0.83)	representative sample Not controlled by diet and physical activity related variables
Bauer et al. 2011 USA	253 girls (and their parents) from 12 schools whom participated in New Moves, a physical and nutrition intervention in Minnesota: 29% white, 26% African-American/black, 24% Asian, 11% Hispanic, 3% American Indian, 8% mixed	15.7	71%	Measured weight and height Overweight: BMI \geq 85 th percentile based on CDC standards for age and sex. Total percentage of body fat assessed by	Parents reported by questionnaire Weekly frequency of family meals (lack of detailed information about the specific question asked)	Race, age, parental education , random effect of school, and physical activity, television and dietary intake family environment [#]	NS* inverse association between FFM and BMI or percentage of body fat	Parents reported FFM Small sample

	race/other			dual-energy X-ray absorptiometry				
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1. * NS: Non statistically significant (p>0.05)

† β: Beta coefficient from multiple regression analysis

Physical Activity Family Environment: home PA resources, parental total PA, parental moderate-to-vigorous PA, family support to PA; TV Family Environment: media resources, numbers of TVs in home, TV in bedroom, parental TV use, familial encouragement to decrease TV use; Dietary Intake Family Environment: home availability of fruits and vegetables/ unhealthy food and soft drink, parental fruits and vegetables intake, familial encouragement to eat healthy food, fast food family meal frequency

SEP: Socio-economic position

Table 2. Characteristics and main results of longitudinal studies included.

Authors / Year / Country	Sample	Age (Mean or Range)	Follow-up duration / Retention rate	Anthropometric Measurement	Frequency of Family Meals (FFM) Measurement	Control variables	Risk of overweight	Main Limitations
Taveras et al. 2005 USA	14431 school children (46,1% males) from national cohort of registered nurses: 93% non-Hispanic white	9-14	3 years (1996-1999) 87.5 %	Self-reported weight and height Overweight: BMI \geq 85 th percentile based on CDC standards for age and sex	Self-reported by questionnaire: How often do you sit down with other members of your family to eat dinner or supper?: Never, some days, most days and every day	Race, gender, age, baseline and follow-up menstrual status and Tanner stage, baseline height, annual change in height, BMI z-score, physical activity and inactivity	Longitudinal analysis (1 year incidence) Dinner with family every day vs. never or some days OR 0.96 (NS*) Cross-sectional analysis Dinner with family every day vs. never or some days OR 0.85 (CI 95% 0.76-0.96)	Self-reported anthropometric data Non representative sample (sons and daughters of registered nurses mainly from one racial group) Not controlled by SEP and diet related variables

Sen 2006 USA	5014 (3774 in the longitudinal analysis) pre and adolescents from a national cohort: 55% non-Hispanic whites, and 45% Hispanics and black	12-15	3 years (1997-2000) 70.9 %	Self-reported weight and height Overweight: BMI \geq 95 th percentile based on CDC standards for age and sex	Self-reported by interview: During the past year, how many days your family ate together in a typical week?: 1 to 7 days a week	Race, gender, age, attainment of puberty, family structure, maternal education, poverty status, computer in the household, and family connectedness	Longitudinal analysis (3-year incidence) Null or NS* associations in most subgroups analyzed (stratified by race and sex) Cross-sectional analysis (non-hispanic whites; n=2736) Family eating together 7 days vs. 0 days a week OR 0.55 (CI 95% 0.32-0.94)	Self-reported anthropometric data Not controlled by diet and physical activity related variables
Gable et al. 2007 USA	8000 school children (48% males) from a national cohort: 63% non-Hispanic white, 16% Hispanic,	5.7 (mean age at baseline)	3 years (1998-2001) 49 %	Measured weight and height Overweight: BMI \geq 95 th percentile based	Parents reported by phone interview In a typical week, how many times at least some of	Race, gender, age, socioeconomic position, child TV hours per week, child aerobic exercise days per week, child	Longitudinal analysis (3 year incidence) For each breakfast or dinner eaten together as a family	Parents reported FFM Low retention rate Not controlled by

	10% African American, 5% Asian, 3% multirace, 2% native Hawaiian / Pacific islander, and 1% American indian or Alaskan native			on CDC standards for age and sex	the family eats breakfast or dinner together?	opportunities for activity, and neighborhood safety.	OR 0.93 (95%CI 0.90-0.97)	diet related variables
Fulkerson et al. 2008 USA	2516 adolescents (45% males) from Minnesota: 48% white, 19% Asian, 18% African American, 6% Latino, 4% native American and 4% other / mixed	15 (mean age at baseline)	5 years (1998-2003) 53 %	Self-reported weight and height Overweight: BMI \geq 85 th percentile, based on the Clinical Guidelines for Overweight in Adolescent Preventive Services standards	Self-reported by questionnaire During the past seven days, how many times did all, or most, of your family living in your house eat a meal together? Never, 1-2 times, 3-4 times, 5-6 times, 7 times, and more than 7 times a week	Race, Age, baseline overweight status, socioeconomic position, physical activity in leisure time, sedentary behaviors, and energy intake	Longitudinal analysis: 5-year incidence Null or NS* associations in all subgroups analyzed (stratified by age and sex)	Self-reported anthropometric data Low retention rate

2. * NS: Non statistically significant ($p>0.05$)

Table 3. Quality assessment of the studies included in the Systematic Review (N=15).

Quality item	Number of studies n (%)
Measured weight and height	9 (60)
Controlling for potential confounding factors:	
- Age or gender	2 (13)
- Age or gender and socioeconomic position	6 (40)
- Age or gender, socioeconomic position and diet-related variables	3 (20)
- Age or gender, socioeconomic position, diet and physical activity related variables	4 (27)
Response or retention rate > 70%	8 (53)
Information provided by participants	10 (66.7)

Table 4. Main limitations regarding frequency of family meals measurement and suggestions for future research.

Limitations	Suggestions
<p>Lack of standardization of what is considered a family meal, regarding:</p> <ul style="list-style-type: none"> - Where the meal is eaten (At home? Sitting on the table?) - Which and how many members have to be present - What meals are considered (dinner, breakfast, both or all) 	<p>Establish a standard definition of family meal, including any of the main meals wherever is eaten, and specifying who has to be present.</p>
<p>Variability in the method of measurement, regarding:</p> <ul style="list-style-type: none"> - The tool applied (self-administered questionnaire or interview) - The respondents (participants or their parents) - The reference period used (last week, typical week, last 5 school days, undefined) - The measurement unit of frequency (number of days, some days, a few times a week) 	<p>Evaluate family meals through direct observation or validated questionnaires applied to the participants by trained interviewers whenever possible.</p> <p>When using questionnaires, measure the usual number of family meals during a typical week for a specified period of time, preferably last year, to take into account daily and seasonal variability.</p>
<p>Lack of information regarding key components of family meals and other relevant confounding factors:</p> <ul style="list-style-type: none"> - Meal length - Nutritional value - Whether the family is watching TV while eating - Socio-demographic characteristics - Physical activity and diet related variables 	<p>Collect detailed information about key components of family meals and other relevant confounding factors.</p> <p>Regarding TV use, in addition to the total watching TV time, is important to know whether TV viewing takes place during the meals, because this habit could counteract the potential benefit of family meals on obesity risk.</p>