

**A systematic review of the quality, content and context of breakfast
consumption**

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Please cite as: Mullan, B. A. & Singh, M. (2010). A systematic review of the quality, content, and context of breakfast consumption. *Nutrition and Food Science*, 40(1), 81-114. DOI: [10.1108/00346651011015953](https://doi.org/10.1108/00346651011015953)

Abstract.

Purpose: Consumption of breakfast is often associated with important health related behaviours. For example, skipping breakfast is related to obesity and eating breakfast is also correlated to cognitive, behavioural, and affective components. This paper attempts to review the breakfast eating literature, and investigate the circumstances under which people consume breakfast, what is actually being consumed, and how much breakfast is eaten therefore

Method/Approach: This systematic review summarised the results from 24 studies which focus on who is eating what, where, and with whom.

Findings: All 24 of the included studies were of a self report nature, from which nine were analyses from second-hand survey data. Sample sizes varied from 100 to a total of 35119 with a reported participants' age range from two years old to 70 years of age. Ready-to-eat cereal and dairy foods were the most commonly consumed breakfast items across the studies. Between 1.7 and 30% of participants were found to skip breakfast and approximately one quarter of the studies reported that those with lower socio-economic status, non-whites and females were the groups more likely to omit breakfast.

Practical implications and Limitations: The evidence provided in this review suggests that there is still considerable variation in studies into breakfast consumption. This has implications for future research into breakfast eating if interventions are based on these studies.

Originality/Value: There are very few systematic reviews detailing the quality, context and content of breakfast consumption and the lack of consistency in the results show the need for further research to be conducted to find a degree of consistency in how breakfast should be defined and measured.

Keywords: Breakfast, systematic review

Introduction

Consumption of breakfast is often considered as one of the most important health-related behaviours and there has been considerable research into its effects. Over the past years, many studies have claimed that breakfast eating behaviours can effect behavioural, cognitive, and affective aspects of a person (A.P Smith, 1998).

Behaviourally, studies have mainly focused on nutrient intake and Body Mass Index (BMI) and its relationship with breakfast habits. An inverse relationship has been found between BMI and breakfast consumption suggesting breakfast eaters tend to have lower body mass index than breakfast skippers, and obese individuals are more likely to skip breakfast or consume less energy at breakfast (Boutelle, Neumark-Sztainer, Story, & Resnick, 2002). Studies have shown that the energy intake of normal and under weight persons is more evenly distributed throughout the day than that of the obese (Ortega et al., 1998). The main reasons that have been proposed to explain why breakfast skipping is associated with a decreased ability to lose weight have a focus on the assumption that breakfast skipping can lead to over eating later in the day (Rampersaud, Pereira, Girard, Adams, & Metz, 2005). Studies have also shown that what is actually consumed at breakfast has an effect on the body. For example, eating cereal or breads for breakfast has been found to be associated with a significantly lower BMI in participants when compared to those who skip breakfast or consume meat and/or eggs for breakfast (Cho, Dietrich, Brown, Clark, & Block, 2003).

The consumption of breakfast has also been widely researched with regards to its effect on cognition, academic performance and concentration, mainly in school children. Theoretically, two biological mechanisms by which breakfast may affect brain function and cognitive test performance have been suggested. The first involves metabolic changes associated with an overnight fast to maintain the availability of energy and nutrients to the central nervous system (Pollitt & Mathews, 1998). The other involves the long-term beneficial effects that breakfast may have on overall nutrient intake and nutritional status, which could consequently affect cognition (Pollitt & Mathews, 1998). Research suggests that the effects of breakfast on cognition do translate into

long term scholastic benefits (Pollitt & Mathews, 1998). Cueto, Jacoby and Pollitt (Cueto, Jacoby, & Pollitt, 1998) suggest that consuming breakfast has a short term positive effect on basic cognitive processes, thus, further suggesting that there is the potential for profound long term effects.

Affective implications for breakfast consumption have also made up a large proportion of the literature on breakfast eating habits. Recent research has shown that regular consumption of breakfast cereal is associated with lower stress levels and reports of better physical and mental health. Research has also suggested that individuals who consume a cereal breakfast each day are less depressed, less emotionally distressed and have lower levels of perceived stress than those who did not eat breakfast each day (A.P Smith, 1998; A. P Smith, 1999, 2002)

Due to the importance of eating breakfast, considerable research has been undertaken to explore the reasons given for skipping breakfast. Reported reasons for poor breakfast habits include stress, lack of time, lack of parental control (parents working outside the home or divorced parents), or as part of the individualization process (Mullie, De Ridder, Deriemaeker, Duvigneaud, & Hebbelink, 2006; Shaw, 1998).

Breakfast makes an important nutritional contribution to dietary quality and overall health, yet breakfast is more commonly missed than any other meal (Utter, Scragg, Schaaf, & Fitzgerald, 2007). Previous studies have found that breakfast consumption has declined in all age groups over the past 25 years, particularly amongst older females and female adolescents aged from 15-18 years (Australian Bureau of Statistics, 1995; Keski-Rahkonen, Kaprio, Rissanen, Virkkunen, & Rose, 2003). For adolescents, skipping breakfast has been associated with a greater body mass index (BMI) and studies have shown that adolescents who eat breakfast make better food choices throughout the day, and those who skip breakfast generally fail to compensate at other eating occasions/opportunities (Nicklas, Reger, Myers, & O'Neil, 2000).

Despite the importance of understanding the content of breakfast there is inconsistency in both how breakfast is defined and how it is measured. Previous reviews of breakfast consumption have concentrated predominantly on the impact of breakfast skipping on cognition (Rampersaud et al., 2005)

nutritional variables (Ruxton & Kirk, 1997) and impact of breakfast on body mass index (BMI) (Rampersaud et al., 2005). A variety of definitions are used throughout breakfast studies including consuming breakfast every day, every school day, on the dietary survey day, a minimum number of days per week, usual or habitual consumption, or consumption of one food item between 5 am and 9 am (Haines, Guilkey, & Popkin, 1996; Rampersaud et al., 2005). A review by Ruxton and Kirk (Ruxton & Kirk, 1997) examined the association between breakfast and measures of dietary intake, physiology, and biochemistry. Specifically, the paper examined studies reporting associations between breakfast and a number of health related issues such as, diet, nutritional status, serum lipids, appetite and body weight change.

In addition, both the Rampersaud et al's, (10) and Ruxton and Kirk's (Ruxton & Kirk, 1997) reviews, while comprehensive, are not true systematic reviews. Therefore, there appears to be a need for a systematic review into what is consumed at breakfast, who is consuming it, when and in what context.

Search Strategy

Electronic literature searches were performed using Proquest5000, PsychINFO, Medline, and Web of Knowledge databases (1980 to present 2008). Separate lists of keywords were used to identify studies including *Breakfast, skip*, miss*, eat*, consum*, have, ingest, omit**.

Reference lists from identified papers and of reviews in related areas were manually searched for additional studies. Grey literature was hand searched using the OVID Dissertation and Thesis Database. The keyword used was *Breakfast*.

Database	Word (limit)	Hits	Narrowed
Proquest 5000	Breakfast (citation + Abstract)	60507	
	Breakfast AND Consumption (citation + Abstract)	100	8
Psych info @ OvidSP cross-search: searches psych info, psychBOOKS, PsychArticles, and PsychCritiques @ovid simultaneously	Breakfast (Title)	71	0
PubMed	Breakfast	8236	

	Breakfast (title)	36	0
Medline via OvidSP	Breakfast (title)	604	1
Web of Knowledge	Breakfast (title)	2097	7
Hand Searched			8

A total of 2908 abstracts were obtained from the database searches. All papers were screened and a total of 24 papers were included in the review in accordance with the exclusion and inclusion criteria, as detailed below.

Study selection criteria

Exclusion Criteria	Inclusion Criteria
Exclude experiments	English speaking papers only
Exclude intervention based studies	Predominantly about breakfast eating/consumption and not just breakfast skipping
Exclude research conducted in babies and the elderly	Predominantly about breakfast and not just eating habits in general
Exclude studies conducted on hospitalized or institutionalized people	Include research in humans published in peer-reviewed journals
Exclude studies that provide the participants with the food, for example, school breakfast eating programs or breakfast clubs	

Review method

The titles and abstracts of the identified records were initially screened for their relevance. Articles were rejected if it was determined from the title and abstract that the study failed to meet the above mentioned selection criteria. When an article could not be rejected with certainty based on the title or abstract, the full text paper was retrieved for further evaluation. Any ambiguities regarding the application of the selection criteria were resolved through discussion among the two researchers.

Results

Study characteristics

All 24 of the included studies were of a self report nature. Nine of the studies were analyses from second-hand survey data in which aspects of a larger survey were used as the data for the study (Baric & Satalic, 2002; Barton et al., 2005; Haines et al., 1996; Kuczynski, Cleveland, Goldman, & Moshfegh, 2007; Song, Chun, Obayashi, Cho, & Chung, 2005; Sungsoo, Dietrich, Brown, Clark, & Block, 2003; Utter et al., 2007; Williams, 2007; Wilson, Parnell, Wohlers, & Shirley, 2006). The remaining 15 studies collected data using the methodology of surveys and administered as an interview (Alves & Boog, 2007; Nicklas et al., 2000; Vanelli et al., 2005), a combined interview and survey (Hooper & Evers, 2003) or a questionnaire (Affenito, 2007; Aranceta, Sera-Majem, Ribas, & Perez-Ridrigo, 2001; Gross, Bronner, Welch, Dewberry-Moore, & Paige, 2004; Matthys, De Henauw, Bellemans, De Maeyer, & De Backer, 2007; Morgan, Zabik, & Stampely, 1986; Mullie et al., 2006; Ortega et al., 1996; Ruxton, O'Sullivan, Kirk, Belton, & Holmes, 1996; Shaw, 1998; Siega-Riz, Popkin, & Carson, 1998; Timlin, Pereira, Story, & Neumark-Sztainer, 2008).

Sample sizes varied from 100 to a total of 35119. The large number of participants across all the studies was mainly due to the way the data was collected, for example, from national data surveys (Haines et al., 1996). Based on the 24 included studies, the reported participants' age range was from two to 70 years of age.

With regard to the target participants of the studies, 19 of the 24 studies were conducted with children and/or young people/adolescents. Three specifically included adults only (Alves & Boog, 2007; Haines et al., 1996; Song et al., 2005) and two included both adults and young people (Kuczynski et al., 2007; Sungsoo et al., 2003).

The majority of studies were conducted in America, with 11 from the United States of America (Affenito, 2007; Barton et al., 2005; Gross et al., 2004; Haines et al., 1996; Kuczynski et al., 2007; Morgan et al., 1986; Nicklas et al., 2000; Siega-Riz et al., 1998; Song et al., 2005; Sungsoo et al., 2003; Timlin et al., 2008) one from South America (Alves & Boog, 2007) and one from Canada (Hooper & Evers, 2003). There were four studies from Australasia, two from New Zealand (Utter et al., 2007; Wilson et al., 2006) and

two from Australia (Shaw, 1998; Williams, 2007). The remainder were from Europe (see Table 1 for individual European countries).

Study Quality

All 24 of the included studies used self-report questionnaires as their main outcome measures. This method of data collection allowed for large samples to be feasible, which is very important for both descriptive and explanatory analyses, especially where several variables were to be analysed (for example, socio-economic status or Body Mass Index) (Babbie, 2007). However, the self-report nature of questionnaires can also result in reporting errors including response bias (responding in a way participants believe the questioner wants them to answer) and recall bias (response is affected by participant's memory), which was found to be a limitation common to all of the studies incorporated in this review.

Nine of the studies used second-hand survey data in which the data was collected from one researcher, and then analysed by another researcher for a different purpose (Baric & Satalic, 2002; Barton et al., 2005; Haines et al., 1996; Kuczynski et al., 2007; Song et al., 2005; Sungsoo et al., 2003; Utter et al., 2007; Williams, 2007; Wilson et al., 2006). The key problem with secondary analysis involves the question of validity. When one researcher collects data for a particular purpose, there is no assurance that data is appropriate for the secondary analyses, which may have resulted in the manipulation and misrepresentation of the data to suit the needs of the study.

Table 1 near here.

Definition of Breakfast

As can be seen in Table 1, only 8 of the 24 studies provided a definition of the word "Breakfast". These ranged from consumption of weekday breakfast between 5am and 9am (Haines et al., 1996) to between 5am and 10am (Barton et al., 2005; Siega-Riz et al., 1998) to between 6am and 10am (Aranceta et al., 2001) and between 6am and 9am (Wilson et al., 2006) and on weekends from 5am to 11am (Barton et al., 2005) and 6am to 11am (Aranceta et al., 2001). Ruxton et al, (1996) defined breakfast as any solid

food item taken before attending school or before 11am at the weekend. For participants attending summer sports camp, breakfast was defined as any food or beverage between 6am and 8am (Vanelli et al., 2005). One definition suggested that breakfast was anything that the respondents considered breakfast (Sungsoo et al., 2003).

Actual food consumed

Ten studies only reported the nutritional content of the food, for example in terms of fibre and calcium (Affenito, 2007) rather than the actual foods consumed. While these studies must have measured actual foods eaten, this is not how it was reported (Affenito, 2007; Barton et al., 2005; Gross et al., 2004; Morgan et al., 1986; Mullie et al., 2006; Nicklas et al., 2000; Shaw, 1998; Song et al., 2005; Timlin et al., 2008; Williams, 2007). A further two studies looked at 'full breakfast' (Alves & Boog, 2007) and 'good quality breakfast' (Matthys et al., 2007), however, neither of these studies provided clear detail as to what was considered a 'good' breakfast.

Of the remaining studies, while detailing actual foods consumed, a wide variation of results was found (see Table 2), ranging from grams of food consumed, for example (Haines et al., 1996), to percentage of usual breakfast eaters consuming specific foods, for example (Utter et al., 2007). Ready-to-eat-cereal and dairy consistently were demonstrated to be the most commonly consumed breakfast items. This was followed by fruit and fruit juice, and bread produce (see Table 2).

Proportion of breakfast skippers

The proportion of participants who skipped breakfast varied between 1.7% in Croatia (2002), and 30% in Brazil (2007) (see Table 2). Approximately 20% of participants in the majority of USA studies were reported to skip breakfast (Gross et al., 2004; Kuczynski et al., 2007; Nicklas et al., 2000; Sungsoo et al., 2003). Five studies reported that participants with a lower socio-economic status were more likely to skip breakfast and engage in 'lower quality' breakfast behaviours (Affenito, 2007; Aranceta et al., 2001; Kuczynski et al., 2007; Ruxton et al., 1996; Utter et al., 2007) whereas two studies reported that breakfast consumption was related to gender (Shaw, 1998) and

behavioural changes (Siega-Riz et al., 1998) and that socio-economic patterns had minimal bearing on breakfast eating patterns (Shaw, 1998; Siega-Riz et al., 1998).

Discussion

Definition of Breakfast

The lack of a universal definition for breakfast and measurement of the breakfast meal has led to some conflicting results, as the definition may have a direct impact on the responses given by the participants. Qualitative research has suggested that adolescents have a very clear idea of the types of foods that constitute breakfast, as well as the time at which it is consumed. (Chapman, Melton, & Hammond, 1998) This suggests the definitions of breakfast need to include components of time and type of food. For example, Chapman et al (1998) suggested that at weekends, consumption of bacon and eggs is considered breakfast, even if consumed at lunch time, whereas a late breakfast that consisted of lunch items, was not considered breakfast.

Geographical origin of the studies

Although the majority of studies were conducted in America, suggesting a bias, no obvious differences were found across the regions with regards to definitions of breakfast or percentage of breakfast consumed. Nonetheless, it is important to note that it may not be possible to generalise from these studies due to these regional differences and future research, using consistent definitions of breakfast across different studies, is needed.

Breakfast food consumed and Portion Size

Due to the differing definitions of breakfast between studies, there was also much variety regarding how consumed breakfast foods were measured. Many studies only reported nutritional content rather than actual foods consumed. This makes drawing any conclusions problematic, however, ready-to-eat-cereal and dairy consistently were demonstrated to be the most commonly consumed breakfast items with fruit and fruit juice, and bread produce also being frequently consumed. It is important in future research that these

discrepancies are eliminated so that true comparisons across studies can be conducted.

A further limitation is that only 4 of the 24 studies mentioned portion size (Baric & Satalic, 2002; Kuczynski et al., 2007; Mullie et al., 2006; Williams, 2007). However, five of the studies made reference to the quality of the breakfast (Aranceta et al., 2001; Haines et al., 1996; Matthys et al., 2007; Siega-Riz et al., 1998; Utter et al., 2007). According to Aranceta et al (Aranceta et al., 2001), a 'good quality' breakfast consists of food from the dairy, cereal and fruit groups and suggests that only 5% of their sample had a good quality breakfast. They further indicate that 70% of their sample did not consume fruit at breakfast time. One difficulty with this sort of definition is that it does not take into account other sources of fruit in the day. According to the Australian guidelines people, people should consume two serves of fruit and five vegetables a day, as suggested by the 2 & 5 campaign endorsed by the Australian Government. It is not unreasonable to assume that these fruit and vegetable guidelines could be being met at other times of the day. Therefore, to categorise breakfast as being of 'poor' or 'good quality' may be erroneous. Similarly, these studies that divide breakfast into categories of 'good' and 'bad' may classify certain breakfast foods as unsatisfactory (Utter et al., 2007), whereas continental or cooked breakfasts by contrast are seen as satisfactory, regardless of portion size or nutritional content. It can be argued that the energy and nutritional content of a convenience food (for example, a good quality cereal bar) is better than a poor quality continental breakfast (For example, Utter et al, (Utter et al., 2007), describes white bread and all toast spreads as part of a healthy breakfast).

Skipping Breakfast

The proportion of participants who skipped breakfast varied considerably. According to Baric and Satalic (2002) only 1.7% of Croatians skipped breakfast, whereas, Alves and Boog (2007) found that 30% of Brazilian participants skipped breakfast. Some of these differences in breakfast consumption can be explained by class, gender, and racial differences, as detailed below. However, it may be that these differences may be related to how breakfast is defined.

Socio-demographic variables

Conflicting reports were found between the studies, about which socio-demographic groups were mostly likely to skip breakfast. This lack of consistency in results shows the need for further research into this area. However 5 studies (Affenito, 2007; Aranceta et al., 2001; Kuczynski et al., 2007; Ruxton et al., 1996; Utter et al., 2007) reported that those of lower socio-economic status were more likely to omit breakfast suggesting that interventions may need to target people in this demographic.

Of the 24 studies, only six discussed race as a variable in breakfast consumption (Affenito, 2007; Haines et al., 1996; Nicklas et al., 2000; Song et al., 2005; Timlin et al., 2008; Utter et al., 2007). All six studies reported that the majority of breakfast skippers were non-white. With the exception of the Utter study (Utter et al., 2007), the remainder of the studies that considered race were based in the United States of America, again reducing the generalisability of results. This highlights the need for more research into racial differences in breakfast consumption across Europe and Australasia.

Thirteen of the 24 studies reported that generally breakfast skipping behaviours increased for both males and females during the years of mid adolescence and overall females were more likely to skip breakfast in any age group (Affenito, 2007; Aranceta et al., 2001; Barton et al., 2005; Gross et al., 2004; Haines et al., 1996; Morgan et al., 1986; Mullie et al., 2006; Nicklas et al., 2000; Shaw, 1998; Siega-Riz et al., 1998; Song et al., 2005; Timlin et al., 2008; Utter et al., 2007).

Context

Not all breakfast is consumed in the home, ranging from 25% of participants eating breakfast elsewhere (Kuczynski et al., 2007), to 17% of participants eating breakfast on the way to school or at school (Utter et al., 2007) to a low of only 5% eating breakfast away from home (Ortega et al., 1996). This again, has implications for future interventions aimed at increasing breakfast consumption.

Other contextual considerations included one study which found that eating together had a positive impact on breakfast (Alves & Boog, 2007)

Shaw (1998) reports that breakfast skipping was more frequent when eating alone, or when breakfast had to be prepared by teenagers themselves and found that the social context played an important role in the consumption of breakfast. The context was also seen as a determining factor of the consumption of a 'good quality' breakfast. It was found that children having breakfast with their family were classified in the "good quality" breakfast group (Aranceta et al., 2001). Further research needs to be done to look specifically at where people are consuming breakfast and with whom and its impact on the breakfast eating behaviour. This will allow a greater understanding of the impact of context on breakfast consumption or omission, which can further provide suggestions on how to increase this healthful behaviour.

Table 2 near here.

Limitations

There may have been bias in this review due to the exclusionary criteria that formed the basis of the studies included in this review. Although a literature search was done to identify any related 'grey literature', this review relied primarily on published studies and research and hence, may be subject to publication bias. In addition, there may be relevant studies published in languages other than English that have not been included in this review.

Conclusion

The evidence provided here suggests that there is still considerable variation in studies into breakfast consumption. This has implications for interventions and breakfast eating if interventions are based on these studies. Therefore, further research is needed to look specifically at why people engage in certain breakfast eating habits and the impact that variables have on this behaviour, such as context, culture and race. The lack of consistency in the results also shows the need for further research to be conducted to find a degree of consistency in how breakfast should be defined and measured to be able to make more solid conclusions about the context, quality and content of breakfast foods.

Acknowledgements

The idea for the review was conceived by BM. Both authors were involved in compiling the list of references for the review. The 1st draft was composed by MS. All subsequent drafts were written by both authors.

Conflict of Interest

The authors have no conflict of interest to declare.

References

- Affenito, S. (2007). Breakfast: A Missed Opportunity. *Journal of the American Dietetic Association.*, 107(4), 565-569.
- Alves, H. J., & Boog, M. C. (2007). Food behavior in student residence halls: a setting for health promotion. *Revista de Saude Publica.*, 41(2), 197-204.
- Aranceta, J., Sera-Majem, L., Ribas, L., & Perez-Ridrigo, C. (2001). Breakfast consumption in Spanish children and young people. . *Public Health Nutrition*, 4(6A), 1439-1444.
- Australian Bureau of Statistics. (1995). National Nutrition Survey. Retrieved 10/12/06, from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyTopic/1173B761B1662AE9CA2568A900139371?OpenDocument>
- Babbie, E. R. (2007). *The Practice of Social Research 11th edition*. Belmont, California: Wadsworth Thompson Learning.
- Baric, I. C., & Satalic, Z. (2002). Breakfast quality differences among children and adolescents in Croatia. *International Journal of Food Sciences and Nutrition*, 53(1), 79-87.
- Barton, B., Eldridge, A. L., Thompson, D., Affenito, S. G., Striegel-Moore, R. H., Franko, D. L., et al. (2005). The relationship of breakfast and cereal consumption to nutrient intake and Body Mass Index: The National Heart, Lung, and Blood Institute Growth and Health Study. *Journal American Dietetic Association*, 105, 1383-1389.
- Boutelle, K., Neumark-Sztainer, D., Story, M., & Resnick, M. (2002). Weight Control Behaviors Among Obese, Overweight, and Nonoverweight Adolescents. *Journal of Pediatric Psychology*, 27(6), 531-540.
- Chapman, G. E., Melton, C. L., & Hammond, G. K. (1998). College and university students' breakfast consumption patterns: behaviours, beliefs, motivations and personal and environmental influences. *Canadian Journal of Dietetic Practice and Research*, 59(4), 176-182.
- Cho, S., Dietrich, M., Brown, C. J. P., Clark, C. A., & Block, G. (2003). The Effect of Breakfast Type on Total Daily Energy Intake and Body Mass Index: Results from the Third National Health and Nutrition Examination Survey (NHANES III), *Journal of the American College of Nutrition* (Vol. 22, pp. 296-302): Am Coll Nutrition.

- Cueto, S., Jacoby, E., & Pollitt, E. (1998). Breakfast prevents delays of attention and memory functions among nutritionally at-risk boys. *Journal Of Applied Developmental Psychology, 19*(2), 219-233.
- Gross, S. M., Bronner, Y., Welch, C., Dewberry-Moore, N., & Paige, D. M. (2004). Breakfast and lunch meal skipping patterns among fourth-grade children from selected public schools in urban, suburban, and rural Maryland. *Journal of the American Dietetic Association, 104*(3), 420-423.
- Haines, P. S., Guilkey, D. K., & Popkin, B. (1996). Trends in Breakfast Consumption of US Adults Between 1965 and 1991. *Journal of the American Dietetic Association, 96*(5), 464-470.
- Hooper, M., & Evers, S. (2003). What Do Ontario Children Eat for Breakfast?: Food Group, Energy and Macronutrient Intake. *Canadian Journal of Dietetic Practice and Research, 64*(1), 28-30.
- Keski-Rahkonen, A., Kaprio, J., Rissanen, A., Virkkunen, M., & Rose, R. J. (2003). Breakfast skipping and health-compromising behaviors in adolescents and adults. *European Journal of Clinical Nutrition, 57*, 842-853.
- Kuczynski, K., Cleveland, L., Goldman, J., & Moshfegh, A. (2007). Breakfast in America, 2001-2002. *Worldwide Web Site: Food Surveys Research Group*.
- Matthys, C., De Henauw, S., Bellemans, M., De Maeyer, M., & De Backer, G. (2007). Breakfast habits affect overall nutrient profiles in adolescents. *Public Health Nutrition., 10*(4), 413-421.
- Morgan, K. J., Zabik, M. E., & Stampley, G. L. (1986). Breakfast consumption patterns of U.S. children and adolescents. *Nutrition research, 6*, 635-646.
- Mullie, P., De Ridder, C. D., Deriemaeker, P., Duvigneaud, N., & Hebbelink, M. (2006). Breakfast frequency and fruit and vegetable consumption in Belgian adolescents. *Nutrition & Food Science, 36*(5), 315-326.
- Nicklas, T. A., Reger, C., Myers, L., & O'Neil, C. (2000). Breakfast consumption with and without vitamin-mineral supplement use favorably impacts daily nutrient intake of ninth-grade students. *Journal of Adolescent Health, 27*(5), 314-321.
- Ortega, R. M., Requejo, A. M., Lopez-Sobaler, A. M., Quintas, M. E., Andres, P., Redondo, M. R., et al. (1998). Difference in the breakfast habits of overweight/obese and normal weight schoolchildren. *International Journal for Vitamin & Nutrition Research., 68*(2), 125-132.
- Ortega, R. M., Requejo, A. M., Redondo, R., Lopez-Sobaler, A. M., Andres, P., Ortega, A., et al. (1996). Breakfast habits of different groups of Spanish schoolchildren. *Journal of Human Nutrition and Dietetics, 9*(1), 33-41.
- Pollitt, E., & Mathews, R. (1998). Breakfast and cognition: an integrative summary. *American Journal of Clinical Nutrition, 67*(4), 804S-813S.
- Rampersaud, G. C., Pereira, M. A., Girard, B. L., Adams, J., & Metz, J. D. (2005). Breakfast Habits, Nutritional Status, Body Weight, and Academic Performance in Children and Adolescents. *Journal of the American Dietetic Association, 105*(5), 743-760.
- Ruxton, C. H., & Kirk, T. R. (1997). Breakfast: a review of associations with measures of dietary intake, physiology and biochemistry. *British Journal of Nutrition., 78*(2), 199-213.
- Ruxton, C. H., O'Sullivan, K. R., Kirk, T. R., Belton, N. R., & Holmes, M. A. (1996). The contribution of breakfast to the diets of a sample of 136 primary-schoolchildren in Edinburgh. *British Journal of Nutrition, 75*(3), 419-431.
- Shaw, M. E. (1998). Adolescent Breakfast Skipping: An Australian Study. *Adolescence, 33*(132), 851-852.

- Siega-Riz, A. M., Popkin, B. M., & Carson, T. (1998). Trends in breakfast consumption for children in the United States from 1965-1991. *American Journal of Clinical Nutrition*, 67(4), 748S-756S.
- Smith, A. P. (1998). Breakfast and mental health. *International Journal Food Science Nutrition*, 49(5), 397-402.
- Smith, A. P. (1999). Breakfast cereal consumption and subjective reports on health. *International Journal Food Science Nutrition*, 50(6), 445-449.
- Smith, A. P. (2002). Stress, Breakfast cereal consumption, and cortisol. *Nutritional Neuroscience*, 5(2), 141-144
- Song, W. O., Chun, O. K., Obayashi, S., Cho, S., & Chung, C. E. (2005). Is consumption of breakfast associated with body mass index in US adults? *Journal of the American Dietetic Association.*, 105(9), 1373-1382.
- Sungsoo, C., Dietrich, M., Brown, C. J. P., Clark, C. A., & Block, G. (2003). The effect of breakfast type on total energy intake and body mass index. *Journal Americ College of Nutrition*, 22(4), 296-302.
- Timlin, M. T., Pereira, M. A., Story, M., & Neumark-Sztainer, D. (2008). Breakfast eating and weight change in a 5 year prospective analysis of adolescents: Project EAT. *Pediatrics*, 121, e638-e645.
- Utter, J., Scragg, R., Schaaf, D., & Fitzgerald, E. (2007). At-Home Breakfast Consumption among New Zealand Children: Associations with Body Mass Index and Related Nutrition Behaviors. *Journal of the American Dietetic Association.*, 107(4), 570-576.
- Vanelli, M., Iovane, B., Bernardini, A., Chiari, G., Errico, M. K., Gelmetti, C., et al. (2005). Breakfast habits of 1,202 northern Italian children admitted to a summer sport school. Breakfast skipping is associated with overweight and obesity. *Acta Bio-Medica de l Ateneo Parmense.*, 76(2), 79-85.
- Williams, P. (2007). Breakfast and the diets of Australian children and adolescents: an analysis of data from the 1995 National Nutrition Survey. *International Journal of Food Sciences and Nutrition*, 58(3), 201-216.
- Wilson, N. C., Parnell, W. R., Wohlers, M., & Shirley, P. M. (2006). Eating breakfast and its impact on children's daily diet. *Nutrition & Dietetics*, 63, 15.

Reference & Country	Journal	Subjects	Age (yrs)	Number	Demographics (n)	Method of assessment
Affenito, et. al. (2005) USA	Journal of the American Dietetic Association	Female Children & Adolescents	9-19	2379	Sex Female Only	Longitudinal Second-hand data from 2 studies
Alves, H. J. Boog, M. C. (2007)	Rev Saude Publica	Young Adults	19-39	100	Sex: Male: 68 Female: 32	Interview
Brazil Aranceta, et al. (2001) Spain	Public Health Nutrition	Children & Young People	2-24	3534	Sex Males: 1629 Females: 1905	Cross sectional survey
Baric, I. C. Satalic, Z. (2002)	International Journal of Food Sciences and Nutrition	Children & Adolescents FFQ	7-18	1190	Sex Males: 591 Females: 599	Survey
Croatia Barton, et al. (2005) USA	Journal of the American Dietetic Association	Female Children	9-10	2379	Race Black: 1213 White: 1166	Second-hand data from a longitudinal observational cohort study

Gross, et al. (2004) USA	Journal of the American Dietetic Association	Children	Mean=9	540	Sex Male: 46.3 Female: 53.7 Age 8: 1.5 9:75.2 10:21.9 11:1.5 Race/ethnicity White: 62.2 African American – non Hispanic: 32.2 Hispanic non black: 3.5 Asian/Pacific Islander: 2.0	Paper-and-pencil Survey
Hains, et al. (1996) United States	Journal of the American Dietetic Association	Adults NFCS	≥ 18	6274 in 1965 18033 in 1977-1978 10812 in 1989-1991 Total: 35119	Total % per year group (1965, 1977-1978, 1989-1991 respectively) Age 18-29: 22.7, 28.1, 24.2 30-39: 20.1, 19.2, 24.1 40-59: 37.2, 31.2, 29.5 60+: 20.0, 21.5, 22.3 Gender Male: 44.6, 41.5, 46.8 Female: 55.4, 58.5, 53.2 Race Black: 11.2, 11.3, 10.8 Non-Black: 88.8, 88.7, 89.2	Trends analysis from 3 cross – sectional surveys

Hooper, M. Evers, S. (2003)	Canadian Journal of Dietetic Practice and Research	Children	Average 4.7	305	Sex Male:152 Female:173	Interview & Survey
Canada Kuczynski, K. Cleveland, L. Goldman, J. Moshfegh, A. (2005)		NHANES	2 – 70+			
USA						
Matthys, et al. (2007) Belgium	Public Health Nutrition	Adolescents	13-18	341	Sex Males: 129 Females: 212	Cross-sectional survey
Morgan, et al. (1986) USA	Nutrition Research	Children & Adolescents	1-17	11082	Sex (age 13-17) Males: 1868 Females: 1916	Survey
Mullie, et al. (2006) Belgium	Nutrition & Food Science	Adolescents	12-15	5000	Sex Male: 1390 Female: 3610	Self report questionnaire
Nicklas, et al. (2000) USA	Journal of Adolescent Health	Adolescents	15	711	Sex Males: 285 Females:426 Race Non-white: 119	Re-call interviews

Ortega, R. M. Requejo, A. M. Redondo, R. Lopez-Sobaler, A. M. Andres, P. Ortega, A. Quintas, E. Izquierdo, M. (1996)	Journal of Human Nutrition and Dietetics	Children	9-13	742	Sex Male:420 Female: 322	Survey
Spain Ruxton, C. H. O'Sullivan, K. R. Kirk, T. R. Belton, N. R. Holmes, M. A. (1996)	British Journal of Nutrition	Children	7-8	136	Sex Male: 64 Female:71	Survey
Scotland Shaw (1998) Australia	Adolescence	Adolescents	13	699	Sex Males: 355 Females: 340	Survey

Siega-Riz, et al. (1998) USA	The American journal of Clinical Nutrition	Children & Adolescents	1-18	7513 in 1965 12561 in 1977 4289 in 1989-1991 Total: 24363	Total % per year group (1965, 1977, 1989-1991 respectively) Age 1-4: 23.1, 18.6, 26.3 5-7: 18.5, 15.6, 18.1 8-10: 17.7, 16.3, 17.0 11-14: 22.1, 25.0, 21.0 15-18: 18.6, 24.4, 17.6 Sex Male: 50.9, 50, 50.4 Race Black: 16.8, 15.7, 18.7	Survey
Song, et al. (2005) USA	Journal of the American Dietetic Association	Adults NHNES	≥19	4218	Sex Male: 2097 Female: 2121 Race White: 1841 African American: 827 Hispanic: 1170 Others: 380	Second-hand survey data analysis
Sungsoo, et al. (2003) USA	American Journal of College Nutrition	NHANES III		16452	Sex Male: 7687 Female: 8765 Race non-Hispanic white: 6744 non-Hispanic black: 4722 Hispanic: 4986	Survey

Timlin, et al. (2008) USA	Pediatrics	Adolescents	Time 1 = 14.9 ± 1.6 Time 2 = 19.4 ± 1.7	2216	Sex Male: 1007 Female: 1215 Race White: 63.1% Black: 9.9% Asian: 17.7% Hispanic: 3.8% Native American: 2.7% mixed or other: 2.85%	Longitudinal survey study
Utter, et. al (2007) New Zealand	Journal of the American Dietetic Association	Children NCNS	5-14	3275	Sex Males: 1189 Females: 995 Age group 5-6: 522 7-10: 999 11-14: 663 Ethnicity Maori: 807 Pacific: 516 New Zealand European/Other: 861 Socioeconomic Status NZDep1 (least deprived): 261 NZDep2: 309 NZDep3: 295 NZDep4: 381 NZDep5 (most deprived): 727	Survey interview

Reference & Country	Definition of Breakfast	Actual Foods Consumed	Portion size	Context	Results	Limitations	
Vanelli, M. Iovane, B. Bernardini, A. Chiari, G. Errico, M. K. Gelmetti, C. Corchia, M. Ruggerini, A. Volta, E. Rossetti, S. (2005)	Acta Biomed		Children	6-14	1202	Sex Male: 747 Female: 455	Interview
Italy Williams (2007) Australia	International Journal of Food Sciences and Nutrition	Children & Adolescents ANNS		2-18	3007	Age: 12-18 years only	Survey
Wilson, N. C. Parnell, W. R. Wohlers, M. Shirley, P. M. (2006)	Nutrition and Dietetics	Children CNSO2		5-14	3275	Age: 5-14 yrs	Survey
New Zealand							

Affenito, et. al, (2005)	None	Not defined	Not discussed	Not discussed	Frequency of Breakfast consumption declined with age.	<i>Limited generalisability due to specific sample.</i>
USA					White girls reported more frequent breakfast consumption than African-American girls, the racial difference decreased with increasing age. Day eating breakfast associated with higher calcium and fiber intake in all models, regardless of adjustment variables. Day eating breakfast were predictive of lower BMI in models adjusted for basic demographics, but independent effect of breakfast consumption was no longer sig. after parental education, energy intake, and physical activity were added to the model.	
Alves, H. J. Boog, M. C.	None	Not defined	Not Discussed	43% thought having meals together had a positive impact on their food behaviour.	30% Skipped 13% full breakfast (calcium and energy supply and regulatory food) 37% had standard breakfast (. Milk product and bread product) 20% had partial meal (any other food not included in the definitions above)	<i>24-hour recall method may not reflect "true" breakfast consumption patterns.</i>
Brazil						
Aranceta, et al. (2001)	Any intake of food or beverage between 6am and 10am during weekdays and	Percentage contribution to breakfast energy intake	Not Discussed	Children having breakfast alone classified as having a "poor quality" breakfast (48%) on the QBS. This	Of the sample: 91.2% of males & 92.2% of females usually had breakfast. Males >18 & 14-17 yr old females showed lowest consumption rates.	<i>24 Hr re-call methods may not reflect "true" breakfast consumption of the sample over longer term period.</i> <i>Low generalisability due to specific target sample.</i>
Spain		Milk and Dairy: 34%				

	between 6am and 11am for the weekends and holidays	Buns, cookies, croissants, etc: 24.6% Other cereal products: 20.2% Sugar: 5.25% Fats & Oils: 4.45% Fruit: 3.4% Breakfast Cereal: 5.2%		proportion was significantly lower for those having breakfast with someone else (40%). 8% of children having breakfast with their family were classified in the “good quality” breakfast group. Not Discussed	Low socio-economic backgrounds and low educated parents had lower quality breakfast scores.	<i>No discussion of cultural issues.</i>
Baric, I. C. Satalic, Z. Croatia	None	Percentage contribution to children’s breakfast energy intake Milk and Dairy product: 37.5 Cereal Product: 43.6 Meat Product: 2.9 Eggs: 0.3 Fruits: 5.8 Confectionary: 7.5	Portion sizes were demonstrated with food and dish models.	Not Discussed	1.7% skipped breakfast Average energy intake from breakfast was 26% of the recommended daily allowance.	<i>Breakfast skipping patterns not consistent with similar studies, however this was not further discussed or possible reasons given.</i> <i>Limited generalisability of results due to specific subject group.</i>
Barton, et al. (2005) USA	Eating between 5 am and 10am on weekdays or 5am and 11am on weekends.	Not defined	Not Discussed.	Not Discussed.	Frequency of breakfast and cereal consumption decreased with age. Days eating breakfast were associated with higher calcium and fiber intake in all models. Days eating cereal was predictive of lower BMI.	<i>3-day recall method may not be representative of average breakfast consumption.</i> <i>Self report nature of recall may have caused a social desirability bias.</i> <i>Focus on cereal consumption only</i>

Gross, et al. (2004)	None	Not defined	Not Discussed	Not discussed	Of the sample: 20% reported skipping breakfast at least three times per week.	<i>Participants included only those who attended school during the study with parental consent</i>
USA					Urban students were more than twice as likely to skip breakfast and to eat school prepared meals compared with suburban and rural students.	<i>Parental bias</i> <i>Limited resources for study</i> <i>Limited sample size</i> <i>The accuracy and consistency of the reports from 9 year olds</i>
Haines, et al. (1996)	Consumption of food and/or beverage between the hours of 5am and 9am	Mean grams of food consumed at breakfast from 1989-1991 (Breakfast eaters only)	Not Discussed	Not discussed	Breakfast consumption declined from 1965 (86%) to 1991 (75%).	<i>IV were statistically significant, however effects were small</i>
USA		Low fat milk: 73.0 Whole milk: 44.1 Bacon: 1.1 Eggs: 12.3 All Bread: 22 RTEC: 14.4 Fruit and fruit juice: 68 Butter & Margarine: 2.6 This study does distinguish between high and low fiber cereal and breads.			Breakfast consumption increased with age. Urban-rural and south – non-south differences in breakfast consumption narrowed over time, whereas black - non-black and college – non-college differenced increased slightly or remained constant. The nutritional quality of food consumed at breakfast has improved since 1965.	

Hooper, M. Evers, S. Canada	None	Percentage contribution to children's breakfast energy intake Milk: 30.5 Bread: 2.2 Cereal: 25.8 Fruit: 10.2 Fats: 1.9 Desserts: 1.9 Eggs: 2.7 Processed meats: 2.2 Legumes: 1.2 Other: 11.4	Not Discussed	Not Discussed	4.9% Skipped breakfast 26.9% had <837kj 59.7% had a mid-morning snack Children who consumed <837kj at breakfast were not more likely to have a mid-morning snack than those who had a greater intake.	<i>Results based on single 24hr dietary recalls only. Breakfast intake may vary from day to day, and therefore, may not be representative of regular intake.</i> <i>Proportion of children with low energy intakes at breakfast may be underestimated due to changes in economic circumstances.</i>
Kuczynski, K. Cleveland, L. Goldman, J. Moshfegh, A. USA	None	Most frequently reported foods and beverages (%) RTEC: 28 Bread product: 27 Eggs: 16 Fruit and fruit juice: 34 Milk: 46 Coffee: 33 Soda: 5	Yes. RTEC 2 ounce Bread products: 2 slices fruit: medium banana or ¾ cup strawberries Eggs: 2 Milk: 1/3 cup Coffee: 2 cups Juice: 1 cup Soda 1 ¾ cups	¼ away from home	20% skip breakfast Breakfast skippers are most likely to be: Teens and young adults Black Americans Lower income families	
Matthys, et al. (2007) Belgium	None	Not defined	Not Discussed.	Not Discussed.	Consumers of a good quality breakfast had a better overall dietary pattern than consumers on a low quality breakfast. The energy contribution of breakfast to	<i>Individual breakfast labels and scores were computed based on both nutrient and food item recommendations, however, there is</i>

Morgan, et al. (1986) USA	None	None	Not Discussed.	Not Discussed.	<p>daily energy intake was on average 15.7% for boys and 14.9% for girls.</p> <p>In all adolescents, consumers of a good quality breakfast had sig. higher intakes of bread, fruit, vegetables, milk and milk products, fruit juice, while intake of soft drinks was sig. lower than in consumers of lower quality breakfast.</p> <p>Breakfast skippers:: Boys: 13.2 Girls: 16.9</p> <p>Low Quality Breakfast Boys: 56 Girls: 27</p> <p>Moderate – good quality Boys: 56 Girls: 45</p> <p>Full value breakfast Boys: 13 Girls: 10</p> <p>Breakfasts, especially RTEC, made a valuable contribution to the nutritional intake and quality of the diets of children and adolescents.</p> <p>For females, those who skipped breakfast and to a lesser extent those who did not consume RTEC at breakfast, consumed less nutritious food and/or less food throughout the</p>	<p><i>no general scientific agreement as to which foods have to be consumed and in what amounts.</i></p> <p><i>The introduction of a breakfast score causes a limitation due to the lack of information about the heterogeneity and variability of the breakfast consumption patterns of all adolescents.</i></p> <p><i>The classification method may group subjects with widely differing intakes into one category and subjects with very similar intakes into different categories if they are close to the cut off point, this could produce difficulties when interpreting the results.</i></p> <p><i>The sample includes more girls than boys which could cause a lack of power in the analyses.</i></p> <p><i>Results mainly focused on RTEC with less focus on the nutritional values of the alternative breakfasts that were also consumed by the participants.</i></p> <p><i>Self report nature of the study may have led to bias.</i></p>
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					day.	
					Analyses of average dietary component intake levels of 7 identified problem nutrients showed that omission of breakfast had a strong negative impact on the quality of diets.	
					Frequent consumption of RTEC had higher average daily intakes of problem nutrients and total sugar intakes.	
					Higher average daily cholesterol intakes were found with those not eating RTEC for breakfast.	
Mullie, et al. (2006)	None	None	Fruit and vegetable portions had three categories: 0 to 1 portion a day; 1.5 to 3.5 portions per day, and more than 4 portions a day.	Not discussed	Socio-economic status sig. influenced breakfast freq. with differences between the highest educational programme and the lower technical and occupational programmes. For both sexes, daily breakfast decreased when comparing age groups from 12 years old (female: 61%, male: 67%) to 15 years old (female: 47%, male: 55%).	<i>Uneven distribution of participants – gender, age, language, region, education programme, educational level of mother, time used for traveling to school – resulting in some categories being underrepresented</i>
Belgium						
Nicklas, et al. (2000)	None	None	Not Discussed	Not Discussed	Of the sample: 19% skipped breakfast, with more females (23%) than males (14%).	<i>Small size of ethnic groups compared to Anglo group</i>
USA					36% of non-white females vs. 20% white females skipped breakfast.	<i>Decreased generalisability</i>
					11% of subjects took some type of	<i>Use of single 24 hour dietary recall – may not be reflective of average intake or for weekends</i>

				<p>dietary supplement.</p> <p>Average energy intake at breakfast for those who ate breakfast was 437kcal.</p> <p>% of total daily energy intake was higher from fats and lower from carbohydrates for adolescents who skipped breakfast.</p> <p>The % of subjects consuming at least two thirds of the RDA's was sig. lower among adolescents skipping breakfast than those consuming breakfast.</p>	
<p>Ortega, R. M. Requejo, A. M. Redondo, R. Lopez-Sobaler, A. M. Andres, P. Ortega, A. Quintas, E. Izquierdo, M. Spain</p>	<p>None</p>	<p>Percentage of children consuming particular food groups (school days)</p> <p>Dairy products: 96 Cereals (includes bread, rolls and cookies): 71 Fruits: 16 Protein Group: 4 Others: 75</p> <p>Dairy products: 24 Dairy products, cereals: 53 Dairy products, cereals, fruits: 9 Dairy products, cereals, fruits, protein group: 2</p>	<p>95% Ate breakfast at home</p> <p>42% ate alone</p> <p>43% with brothers or sisters</p> <p>25% ate breakfast with their parents.</p>	<p>3% of boys and 5% of girls skipped breakfast.</p>	<p><i>Results based on medium-high socioeconomic backgrounds only.</i></p>

		Skipped breakfast: 4				
Ruxton, C. H. O'Sullivan, K. R. Kirk, T. R. Belton, N. R. Holmes, M. A.	Solid item of food taken before attending school or before 1100 hours on weekends	Breakfast cereal: 77.2 Bread: 14.7 Cooked: 1.5 Other (includes confectionary, soup and milky drinks – with or without bread): 6.6	Not Discussed	Not Discussed	Breakfast contributed 14% of energy and 9-36% of micronutrient intakes to the overall diets.	<i>Percentage of children participating in weighed intake was low</i> <i>Self report questionnaire may have caused bias</i>
Scotland Shaw (1998) Australia	None	None	Not Discussed	Social Context: Males were more likely to eat alone, but females were more likely to skip.	Findings for this Australian sample showed that breakfast consumption was related to gender, not income, with females skipping more than three times as often as males.	<i>The results in this longitudinal study were conducted on the children when they turned thirteen, thus not providing an overall holistic perspective of their breakfast eating habits.</i> <i>Self-report nature of the study may have cause bias</i>
Siega-Riz, et al. (1998) USA	The consumption of food, beverage, or both between 5am and 10am	Grams of food consumed at breakfast (1991) Milk: 178.9 Eggs: 11.5 Bread: 22.1 Pasta, rice, cooked cereal: 21.5 RTEC: 19.5	Not Discussed	Not discussed	Decline in breakfast consumption from 1965 – 1991, particularly for 15-18 yr old. Rates for boys and girls declined from 89.7% and 84.4% in 1965 to 74.9% and 64.7% in 1991. Breakfast consumption declined	<i>Ability to explain the decline in breakfast consumption limited by the data available</i>

					<p>Fruit and juice: 70.5 Butter/margarine: 2</p>	<p>because of behavioural changes and not sociodemographic patterns.</p> <p>Nutritional quality of foods consumed has improved since 1965.</p> <p>Association between obesity and less frequent breakfast consumption.</p> <p>Changes in breakfast food choices by 1989 – 1991, reflected fewer sources of dietary fat and included more fruit and whole grains.</p>	
Song, et al. (2005)	None	None	Not Discussed	Not Discussed		<p>Of the sample: Breakfast consumers were more likely than non-consumers to be older, female, white, non-smokers, regular exercisers, and trying to control their weight.</p> <p>77% of adults consumed breakfast in one given day with sig. difference between the sexes (74.7% man vs. 79.4% women). Rate of breakfast consumption increased with age from 62.8% among 19-29 yr olds, to 92.5% among participants aged 70 years old and older.</p> <p>For women, daily energy intake was higher among breakfast consumers than non consumers, for both men and women, energy intake from fat among</p>	<p><i>Cause and effect relationship unable to be established in this study.</i></p> <p><i>Focused on only specific aspects of the sample (no mention of socio-economic status, etc).</i></p>
USA							

Sungsoo, et al. (2003)	Any food or beverage consumed in a meal occasion named by the respondents as breakfast.	Percentage belonging to each breakfast category (categories are mutually exclusive). Breakfast skipper: 20.05 Fats and sweets: 4.23 Dairy: 4.55 Fruit and veg: 4.48 Cooked cereal: 4.76 Ready to eat cereal: 17.14% Breads: 27.86 Meat and eggs: 10.87% Beverages: 6.06	Not Discussed	Not Discussed	RTEC breakfast consumers was sig. lower than non RTEC consumers. Energy from carbohydrate among RTEC breakfast consumers was sig. higher than non-RTEC breakfast consumers. 20.05% of the sample were breakfast skippers Subjects who ate RTEC, cooked cereal, or quick breads for breakfast had a sig. lower BMI to those who skipped and meat and egg eaters. Breakfast skippers and fruit/vegetable eaters had the lowest daily energy intake. The meat and egg eaters had the highest daily energy intake. The less common breakfast types included fats and sweets (3.2%) and fruit and vegetables (4.5%).	<i>Self report nature of study may cause a bias in the results.</i> <i>Lack of definition for breakfast categories.</i>
Timlin, et al. (2008)	None	None	Not discussed.	Not Discussed	Frequency of breakfast was directly associated with intake of carbohydrate and fiber, socio-economic status, white race, and physical activity, and was inversely associated with smoking and alcohol consumption, and dieting and weight control behaviours.	<i>Self – report nature of the data believed to cause bias</i> <i>Study was observational in nature</i>

Utter, et. al (2007) New Zealand	None	<p>Percentage of usual breakfast eaters consuming specific foods:</p> <p>5 fruit and veg per day: 5 per day - 53.6%</p> <p>Cereal per day: 43.6%</p> <p>Eggs: 3 per day 18.7%</p> <p>Milk: 5 per day – 47.6%</p>	Not Discussed	<p>Food related behaviours: 17% ate breakfast on the way to school or at school</p> <p>Source of food: School food from home, school food from school,, and school food from take away shop.</p>	<p>Those individuals who never ate breakfast were more likely to be girls (16.4%), whereas those who ate daily were more likely to be boys (37.9%) than girls.</p> <p>Those who ate breakfast daily were younger, whereas those who never ate breakfast were older.</p> <p>In girls, the overall diet of daily breakfast eaters was higher in total energy, fiber, and cholesterol, compared with those who never ate breakfast. For boys, statistically sig. differences by breakfast freq. were observed for dietary carbohydrates and fiber (higher for daily breakfast) and for the % of calories from saturated fat (lower for daily breakfast).</p> <p>Breakfast consumption among boys, aged 5-6 yrs, children aged 7-10 yrs, NZ European children, and children from more wealthy neighbourhoods.</p> <p>Age differences increased with socio-economic deprivation; older children with more socio-economic deprivation were less likely to eat breakfast.</p> <p>Skipping breakfast associated with higher BMI</p> <p>Children who missed breakfast were</p>	<p><i>Frequency of at home breakfast consumption assessed during previous week to the interview – may not reflect typical week</i></p> <p><i>Findings suggest that the relationship between BMI may be moderated by unhealthy snacks purchased outside of home, but there may be other explanations</i></p> <p><i>The relationship between IV & DV may be over estimated.</i></p>
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Juice: 3 per week –
25.5%

sig. less likely to meet
recommendations for fruit and
vegetable consumption and more likely
to eat unhealthful snacks.

No relationship between breakfast
consumption and physical activity.

Children who skipped breakfast less
like to be frequent eater of a Healthful
Breakfast: breakfast cereal, toast
spreads, and non-flavored milk, and
more likely to eat unhealthful snack
foods: meat pies & sausage rolls,
chocolate sweets and candies, and soft
drinks compared to breakfast eaters.

Vanelli, M.	Any food or beverage between 6am and 8am before going to summer sports school.	Frequency of daily consumption	Not discussed	48% ate and drank in silence	78% usually ate breakfast 22% reported skipping breakfast	<i>Results focused on children attending summer sports school – results may vary from when attending regular school or weekends.</i>
Iovane, B.		Age 11 – 14				
Bernardini, A.		Boys		26% played with siblings		
Chiari, G.		Girls				
Errico, M.		Biscuits: 29				
K.		30		18% watched television		
Gelmetti, C.		Snack cakes 18				
Corchia, M.		17				
Ruggerini, A.		Cereal 18		8% talked with parents		
Volta, E.		16				
Rossetti, S.	Cakes 9					
	11					
	Bread 5					
	6					
	Fruit/fruit juice					
	19 19					

Italy		Milk/milk with cocoa 66 66				
Williams (2007)	None	None	Recommended portion sizes:	Not Discussed	Findings show the typical breakfast consumed by young Australians was low in fat, high in carbohydrates and a good source of thiamin, riboflavin, niacin, calcium and magnesium.	<i>24 hour recall may not reflect typical intake patterns</i>
Australia			Bread: 30g RTEC: 20g Cooked rice, pasta or porridge: 90g		There was no difference between the fat intake and the BMI of regular breakfast eaters compared to skippers. Regular breakfast consumption is associated with better diets for children and adolescents. The breakfast meal provided between 12% and 19% of the daily energy intake. Breakfast was generally a very nutritious meal (low in fat 26-30% energy came from fat, high in carbohydrate 55-58% of energy, and a sig. source of dietary fiber and rich in micro nutrients). Those who did not eat breakfast cereal were more likely to have inadequate nutrient intakes, especially of thiamin, riboflavin, calcium, magnesium and iron. RTEC included both cold and warm	

					cereals. The broad category “cereal foods” included breakfast cereals, breads, pastries, cakes and biscuits.	
Wilson, N. C.	Consumption of at least one item between 6am and 9am.	Items consumed at breakfast	Not Discussed	Not Discussed	84% report eating breakfast.	24hr recall data may not be representative of regular breakfast intake.
Parnell, W. R.		Breakfast cereal: 56.9			Habits differed between Maori, pacific and other children.	Limited generalisability
Wohlers, M.		Bread: 35.1				
Shirley, P. M.		Choc flavoured drinks: 13.9				
		Fruit/juice: 16.6				
		Milk: 8.2				
New Zealand		Muffins/cake: 4.7				
		Eggs: 3.3				
		Confectionary: 2.2				