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Original Research

Accuracy of reported food intake in a sample of 7–10 year-old children in Serbia

S. Šumonja [a,*], M. Jevtić [b]

[a] University of Novi Sad, Faculty of Education, Department of Natural Sciences, Serbia
[b] University of Novi Sad, Faculty of Medicine, Department of Hygiene, Serbia

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ABSTRACT

Objectives: Children's ability to recall and report dietary intake is affected by age and cognitive skills. Dietary intake reporting accuracy in children is associated with age, weight status, cognitive, behavioural, social factors and dietary assessment techniques. This study analysed accuracy of 7–10 year-old children's reported food intake for one day.
Study design: Validation study.
Methods: Sample included 94 children aged 7–10 years (median = 9 years) from two elementary schools in a local community in Serbia. 'My meals for one day' questionnaire was a combination of 24-h recall and food recognition form. It included recalls for five meals: breakfast at home; snack at home; lunch at home; snack at school and dinner at home. Parental reports were used as reference information about children's food intake for meals obtained at home and observation was used to gain reference information for school meal. Observed and reported amounts were used to calculate omission rate, intrusion rate, corresponding, over-reported and unreported amounts of energy, correspondence rate and inflation ratio.
Results: Overall omission rate (37.5%) was higher than overall intrusion rate (36.7%). The same food item (bread) has been the most often correctly reported and omitted food item for breakfast, lunch and dinner. Snack at school had the greatest mean correspondence rate (79.6%) and snack at home the highest mean inflation ratio (90.7%).
Conclusion: Most errors in children's recalls were incorrectly reported amounts and not the food items. The questionnaire should be improved to facilitate accurate reports of the amounts.

Introduction

An increasing trend of prevalence of overweight and obese children is an important public health problem in Serbia as in other countries in Europe and USA.[1–3] Therefore, validated food intake assessment techniques in child population are important part of research about the determinants of food intake and obesity in children. Food intake assessment in children is a particularly challenging topic for researchers

* *Corresponding author*. Podgorička 4, 25000 Sombor, Serbia. Tel.: +381 638820270; fax: +381 25416461.
E-mail address: sanjasumonja@gmail.com (S. Šumonja).
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because children's eating habits are variable and influenced by many different factors.[4,5] The eating habits of school-aged children are under control of the parents while adolescents practice more out-of-home eating.[6,7] Furthermore, children's ability to recall and report dietary intake is age-related and affected primarily by their cognitive skills.[8] Previous research shows that children cannot report dietary intake without parental assistance until they reach seven years.[7] The period from seven to 11 years presents transitional period in a child's ability to recall and report dietary intake without assistance. That may be one of the reasons why research, including 7–12 year-old children show different results about accuracy of child-reported food intake.[9,10] Baranowski and Domel explained that an error in reporting dietary intake may occur during every stage of the process of remembering and recalling dietary information in children.[11] Errors in dietary reports may be omitted food items (missing foods), over-reported food items (phantom foods) or incorrectly identifying food items.[6] Factors that are associated with children's recall accuracy include age, weight status, cognitive, behavioural, social factors and dietary assessment techniques.[8,12–14]

The aim of our study was to analyse accuracy of 7–10 year-old children's reported food intake for one day according to parents' reports and observation.

Methods

We conducted the study in a local urban community in northern Serbia. Participants were 1st to 4th grade students. In order to obtain a representative sample, we telephoned all five elementary schools in this community to participate in our study and two schools accepted. At each school, two classes from the first, second, third and fourth grades were randomly selected to take part in the study (184 children). After getting child assent and parental written consent total sample included 94 children (response rate 51.1%).

Data collection that included completing the questionnaires by children and parents and direct observation occurred between March and May 2014. The questionnaire for children was classroom administered by one researcher in all classes during the last school class. The researcher used the same protocol for classroom questionnaire administration in all classes. Children were instructed by the researcher to recall types and amounts of foods they ate for breakfast, snack before school, lunch at home and snack at school on the day of the data collection. Children were further instructed by the researcher to recall types and amounts of food they ate for dinner the day before data collection. Researcher and teachers were present in the classroom while the children were filling the questionnaire in all classes. The researcher clarified food items that children were not able to recognise and provided no further help to children in completing the questionnaire.

'My meals for one day' questionnaire was developed for assessing children's food intake. Questionnaire development was based on a combination of two dietary assessment techniques, 24-h recall and food recognition form.[15,16] It consisted of five parts representing five meals: breakfast at home; snack at home; lunch at home; snack at school and dinner at home. Each part included pictures of different food items from each food group that are usually consumed for these meals and a portion size, which participants used to estimate the amounts of food consumed (e.g. glass, tablespoon, slice, piece). Part of the questionnaire presenting lunch at home was divided into soup, meat, vegetables, bread and pasta, salad, drink and dessert food items. There was an additional option to add food if it was not offered.

Parental questionnaire consisted of the same parts as the child's questionnaire except it did not include pictures of food items. Parental questionnaire also included data about their child's height and weight, which were used to calculate children's body mass index (BMI). A consent form, the letter containing instructions for parents and the questionnaire were sent to parents via children on the same day that the children completed their questionnaires.

We used direct observation of children eating school meal to obtain reference information about children's food intake for that meal. Observations occurred during a 30-min school meal break. All children from each class were observed whether they ate a school meal or food brought from home. Two researchers simultaneously observed children from one class. Each observer simultaneously observed approximately 12 children and recorded items and amounts that were in a child's plate before and after eating. Amounts were recorded in qualitative terms as amounts eaten per serving. Observers took a training session which was consisted of measuring and observing different amounts of food usually eaten for snack in schools and identifying serving sizes of different food items. In this training session, observers identified food and beverage items and amounts in 10 samples of packed lunches (30 food items) previously measured by the third researcher. Accuracy of reporting food items was 93.3% for the first observer and 94.3% for the second observer. Accuracy of reporting food amounts was 91.6% for the first observer and 92% for the second observer.

Food items reported for snack at school were compared to reference information gained by observation of the school meal. Each reported item was classified as a match if it was reported and observed eaten, an intrusion if it was reported, but was not observed eaten and an omission if it was observed eaten, but was not reported.

Food items reported for breakfast at home, snack at home, lunch at home and dinner at home were compared to food items reported by parents. Each item was classified as a match if it was reported by both a parent and a child, as an intrusion if it was reported by child but not reported by parent and omission if it was reported by a parent but was not reported by a child.

Omission rate and intrusion rate were used to present number (%) of omitted or intruded food items.[17] Observed and reported amounts were used to calculate corresponding, over-reported and unreported amounts of energy.[17] Corresponding, over-reported and unreported amounts of energy were then used to calculate correspondence rate and inflation ratio. Correspondence rate is a measure of reporting accuracy that is sensitive to reporting errors.[17] Inflation ratio is a measure of reporting errors.[17] Calculations of energy intake were based on a food database available in Serbian language.[18] The independent *t*-test was used to analyse whether there are statistically significant differences in the omission rate, intrusion rate, correspondence rate and inflation ratio between boys