

S. Brasche  
G. Winkler  
J. Heinrich

## Dietary intake and smoking – Results from a dietary survey in Erfurt in 1991/92

### Ernährung und Rauchen – Ergebnisse einer Ernährungsuntersuchung 1991/92 in Erfurt

**Summary** Data relating to 422 men and 315 women aged 20 to 64 years were collected in 1991/92 using 3-day weighed records. The national German food composition file BLS 2.1 was used for food coding and calculation of nutrients. Age adjusted mean daily intakes were presented.

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Dr. S. Brasche (✉)  
Friedrich-Schiller-University Jena  
Institute of Occupational, Social and  
Environmental Medicine  
Department of Indoor Climatology  
Gustav-Freytag-Str. 1  
D-99096 Erfurt

G. Winkler · J. Heinrich  
GSF – National Research Center for  
Environment  
and Health Neuherberg  
Institute of Epidemiology  
Postfach 1129  
D-85758 Oberschleißheim

Food intake habits of smokers and non-smokers showed distinct differences: for instance, non-smokers of both genders ate more fresh fruit (m: 166 g vs. 119 g,  $p = 0.0001$ ; f: 180 g vs. 147 g,  $p = 0.0009$ ), more milk and milk products (m: 195 g vs. 121 g,  $p = 0.0108$ ; f: 176 g vs. 136 g,  $p = 0.0004$ ), and drank less coffee (m: 401 g vs. 457 g,  $p = 0.0103$ ; f: 387 g vs. 491 g,  $p = 0.0003$ ). As a result, intakes of various nutrients also differed. For example, smokers had lower intakes of fibre, selected vitamins, and minerals. The tendency toward an unhealthier dietary pattern in smokers was in accordance with findings from various industrialized Western countries.

**Zusammenfassung** In der vorliegenden Studie wurden die 1991/92 mittels Wiegeprotokoll-Methode über 3 Tage in Erfurt erhobten Daten von 422 Männern und 315 Frauen im Alter zwischen 20 und 64 Jahren analysiert. Der Bundeslebensmittelschlüssel, Version 2.1, wurde zur Kodierung der Lebensmittel und zur Berechnung der In-

haltsstoffe herangezogen. Die Darstellung der Ergebnisse erfolgte mittels altersstandardisierter Mittelwerte.

Nichtraucher beiderlei Geschlechts verzehrten z.B. mehr frisches Obst (m: 166 g vs. 119 g,  $p = 0.0001$ ; w: 180 g vs. 147 g,  $p = 0.0009$ ), mehr Milch und Milchprodukte (m: 195 g vs. 121 g,  $p = 0.0108$ ; w: 176 g vs. 136 g,  $p = 0.0004$ ) und tranken weniger Kaffee (m: 401 g vs. 457 g,  $p = 0.0103$ ; w: 387 g vs. 491 g,  $p = 0.0003$ ) als Raucher. Als Folge nahmen Raucher beispielsweise weniger Ballaststoffe sowie wenige ausgewählter Vitamine und Mineralstoffe auf.

Diese Ergebnisse aus einer ostdeutschen Population entsprechen denen anderer industrialisierter westlicher Länder.

**Key words** Dietary survey – Smoking – Dietary intake – East Germany

**Schlüsselwörter** Ernährungserhebung – Rauchen – Ernährung – Ostdeutschland

### Introduction

Recently, a variety of studies found healthier dietary patterns in non-smokers as compared to smokers in different Western countries (e.g. 3 – 10). The aim of the present analysis was to investigate whether these differ-

ences also occur in an Eastern transitional society under the changed food market circumstances. Our study was carried out in Erfurt, East Germany in 1991/92 shortly after the reunification of the two German states in 1990. The following facts briefly describe the situation at that time:

- The transitional process in East Germany was marked by a general decrease in social security of the population. One reason, among others, was the large number of persons who lost their jobs and consequently also their social status, their values and ideals. They therefore had to change completely the structure and habits of their usual daily life.
- The East German food market was flooded by the large variety of foods from West Germany (including foods as well as cigarettes).
- The number of female smokers increased (1).
- A slight general tendency towards a healthier food choice – at least partly caused by the improved food supply – was found (12).

## Methods

The dietary survey was carried out in the framework of the MONICA-project (= MONItoring of Trends and Determinants in Cardiovascular Diseases) in 1991/92 in the city of Erfurt on a random sample consisting of 1118 eligible men and 1179 eligible women aged 20 – 64 years. The response rates in the dietary survey were 42 % in men and 28 % in women. Dietary intake was assessed by weighed 3-day records with the aid of scales, household measures and a portion size picture booklet for meals eaten out-of-home. The national German food composition file BLS 2.1 was used for food coding and for the calculation of nutrients. Further details on methods have been previously described elsewhere (2, 11).

The smoking behaviour was assessed by a standardised interview. In the present analysis, smokers were defined as current smokers and non-smokers as never-smokers plus former smokers who gave up smoking at least one year before the interview. Former smokers who quit smoking during the previous year ( $n = 31$ ) were excluded. Finally, 152 male smokers, 270 male non-smokers, 89 female smokers and 226 female non-smokers were included in the comparison.

Reported means of daily intake were age-standardised according to the population of Erfurt in 1991. Wilcoxon-Mann-Whitney tests were applied to the original distributions for the comparison.

## Results

Table 1 shows the mean daily intakes of some selected food groups and nutrients for male and female smokers and non-smokers.

### Foods

In both genders alike, smokers showed significantly lower intakes of milk and milk products (especially yo-

ghurt) and fresh fruit, as well as significantly higher intakes of coffee in comparison with non-smokers. Furthermore, compared with non-smokers, significantly higher intakes of meat combined with significantly lower intakes of cheese were found in male smokers, whereas female smokers showed significantly lower intakes of tropical fruit and table water. Intake differences in fresh vegetables and alcoholic beverages supported the tendency towards an unhealthier food choice in both male and female smokers, without being statistically significant.

### Nutrients

Corresponding to the differences in food intake, male and female smokers had significantly lower intakes of fibre, calcium and magnesium than non-smokers. The intakes of carbohydrates (especially disaccharides), vitamin B2 and vitamin C were found to be significantly lower in female smokers. Men showed similar differences but without statistical significance.

## Discussion

To our knowledge, this is the first study on diet and smoking under the circumstances of political and economic transition. The new era in East Germany opened up vista of a healthier life style in the same way as of an unhealthier behaviour. But the hope did not fulfil that the dietary intake of the smokers was influenced by the increased variety of foods especially of fruits, vegetables, yoghurts and fat reduced margarine in the same way like the dietary intake of the non-smokers. The intake of foods and nutrients differed typically. Our results from Erfurt, however, are in accordance with findings from various industrialised Western countries. So La Vecchia (3), Larkin (4), Martinez-Gonzalez (6), Morabia (8) and Subar (10) found a lower consumption of milk in smokers than in non-smokers, too. On the other hand, Margetts (5) and Oshaug (9) described a higher consumption of whole-milk in smokers than in non-smokers. But Oshaug (9) as well found a lower intake of yoghurt in smokers than in non-smokers, corresponding to our results. Smokers eat more meat and less fresh fruit than non-smokers. These facts were certified by most of the authors for both men and women (3, 4, 5, 6, 8, 9, 10). La Vecchia also found a lower intake of cheese in male and female smokers than in non-smokers. A high consumption of coffee seems typical for smokers (3, 4, 8, 9). Most of the authors found a significant link between alcohol drinking and smoking (3, 4, 8, 10). We could not reproduce these results for the Erfurt population.

A similar intake of energy in smokers and non-smokers was also found in other studies (4, 7, 8). Sometimes female smokers were characterised by a

**Table 1** Mean daily intakes of selected foods and nutrients in smokers and non-smokers aged 20 - 64 years from Erfurt (East Germany)

Age adjusted <sup>1</sup> daily means	MEN			WOMEN		
	Smokers n = 152	Non-Smokers n = 270	p-value <sup>2</sup>	Smokers n = 89	Non-Smokers n = 226	p-value <sup>2</sup>
<b>Food</b>						
Meat (g)	126.7	97.6	<b>0.0039</b>	76.8	76.9	0.3099
Milk + Milkproducts (g)	121.1	195.0	<b>0.0108</b>	135.8	175.7	<b>0.0004</b>
-Yoghurt (g)	24.0	46.8	<b>0.0234</b>	46.9	64.1	<b>0.0041</b>
Cheese (g)	28.6	37.8	<b>0.0004</b>	29.9	31.4	0.1182
Fats (g)	34.2	37.2	0.4751	29.8	27.8	0.3198
Fresh Fruit (g)	119.3	166.0	<b>0.0001</b>	147.4	179.8	<b>0.0009</b>
-Tropical Fruit (g)	63.1	74.8	0.3060	102.8	125.6	<b>0.0003</b>
Fresh vegetables (g)	228.1	239.4	0.4131	174.0	191.9	0.1979
Bread + baked goods (g)	239.5	256.2	0.1310	167.8	175.9	0.0986
Sweets and sugar (g)	26.9	32.1	0.0645	29.5	31.8	0.1163
Non-alcoholic beverages (g)	412.5	420.6	0.4967	369.7	428.7	0.2261
-Table water (g)	144.4	163.8	0.4080	111.1	168.5	<b>0.0111</b>
Coffee (g)	457.1	400.8	<b>0.0103</b>	491.3	386.7	<b>0.0003</b>
Tea (g)	54.1	72.9	0.0525	49.0	57.3	0.5291
Alcoholic drinks (g)	520.9	453.7	0.5523	91.5	93.2	0.6243
<b>Nutrients</b>						
Energy (kcal)	2619.9	2683.9	0.8755	1883.3	1947.1	0.5296
Protein (g)	89.8	90.7	0.8266	64.4	68.3	0.3012
Fat (g)	114.6	116.1	0.4308	83.7	84.8	0.8319
Carbohydrates (g)	232.1	250.8	0.0787	181.8	193.3	<b>0.0467</b>
-Disaccharides (g)	54.1	64.1	0.0844	54.1	63.0	<b>0.0026</b>
Fibre (g)	21.7	24.1	<b>0.0004</b>	18.8	20.4	<b>0.0027</b>
Alcohol (g)	24.7	20.2	0.3626	7.2	5.6	0.2698
Vitamin B2 (mg)	1.65	1.80	0.0548	1.25	1.39	<b>0.0387</b>
Vitamin C (mg)	83.0	90.3	0.1606	101.5	112.9	<b>0.0076</b>
Calcium (mg)	613.8	772.3	<b>0.0001</b>	588.5	652.4	<b>0.0016</b>
Magnesium (mg)	327.5	354.3	<b>0.0065</b>	254.9	279.5	<b>0.0024</b>
Phosphor (mg)	1662.2	1775.9	0.0600	1264.3	1367.8	<b>0.0079</b>

<sup>1</sup> Standard population: Erfurt 1991<sup>2</sup> Wilcoxon-Mann-Whitney-Test

lower intake of energy than female non-smokers (3, 5). Where fibres were included in the analysis, smokers had a lower intake than non-smokers (4, 5, 7, 9, 10). In accordance with our results are the findings of La Vecchia (3) and Larkin (4) with regard to the intake of calcium and of Larkin (4), Oshaug (9) and Subar (10) with regard to the intake of Vitamin C.

The use of different methods of sample selection, data sampling and food coding in the reviewed dietary studies does not disturb this correspondence.

These findings underline the suspicion, that an unhealthier dietary pattern in smokers might be a general phenomenon. This behaviour seems independent of the transitional process in East Germany.

The less favourable dietary pattern in smokers should therefore be taken into account in the discussion of negative health effects related to smoking and has to be a critical matter of concern for nutrition intervention in East Germany, too.

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