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Highlights

► high sodium intake is associated with negative health outcomes ► pizzas had the highest salt content per portion, followed by Chinese meals ► significant differences in salt content between meals in the same category were found ► results show salt content in takeaway food is alarmingly high

Abstract

High sodium intake is associated with negative health outcomes, including an independent correlation with high blood pressure which increases the risk of cardiovascular disease. A high proportion of sodium intake in the UK is from processed and out of the home food; this includes takeaway food which is increasing in popularity. The aim of the present study was to evaluate salt levels in popular hot takeaway meals. A total of 411 samples of 23 different types of takeaway meals were analysed. Obtained results show the salt content in these kinds of foods is alarmingly high. Comparing medians (interquartile range) for different meal categories, Pizzas contained the highest salt content per portion (9.45 g (6.97-12.83), followed by Chinese meals (8.07 g (5.47-10.99g)), Kebabs (6.21 g (4.01-8.35)) and Indian meals (4.73 g (3.61-6.10)). In addition, significant differences in the salt content between meals within the same category were reported. To enable the consumer to meet the UK's target salt intake, a significant reduction in the salt content of hot takeaway meals should be considered.

Key words: takeaways; salt content; hot meals;

Introduction

High sodium intake, which is mostly consumed as sodium chloride, has been reported to be associated with increased blood pressure in many epidemiological studies (Mohan &

Campbell, 2009). In addition, excessive sodium consumption has been shown to be an independent risk factor of coronary heart disease and stroke (Nagata, Takatsuka, Shimizu, & Shimizu, 2004; Tuomilehto et al., 2001). Furthermore, high salt intake may also be associated with other adverse health conditions, including kidney stones, gastric cancer, asthma and osteoporosis (He & MacGregor, 2010a).

In the United Kingdom (UK), the Reference Nutrient Intake for sodium in adults is 1600 mg per day; this is the salt equivalent of 4 g per day (Scientific Advisory Committee on Nutrition, 2003). However, UK current targets are a reduction in average salt intake across the population to 6 g per day per adult (Food Standards Agency, UK, 2009). This target of 6 g per day by 2015 is deemed to be achievable, rather than ideal and further reduction targets have been set to 3 g per day by 2025 (National Institute for Health and Clinical Excellence, 2010).

Following the 2003 report published by the Scientific Advisory Committee on Nutrition (SACN) on Salt and Health, the UK Food Standards Agency initiated a major salt campaign targeting the food industry (Food Standards Agency, UK, 2009). Recent evaluations of this campaign show a reduction of average salt intake from 9.5 g/day to 8.6 g/day, an approximate 10% reduction (Wyness et al, 2011; Shankar et al, 2012). While the UK has made progress and raised consumer awareness, further reductions to reach the UK target of 6 g/day are warranted (National Institute for Health and Clinical Excellence, 2010).

It seems that a crucial factor for development of a proper strategy to reduce the salt intake in the UK population is identification of dietary sodium sources. It has been estimated that in UK diets about 80% of daily sodium intake comes from processed food and the catering industry, including takeaway foods (Henderson et al, 2003; Gilbert & Heiser, 2005; He & MacGregor, 2010b). Eating out of home statistics show 42% of surveyed British consumers ate takeaway foods once a month or less and 32% two or three times a month (Nielson, 2005). Similarly, the

Food Standards Agency, UK, (2007) reported that 22% of Britons purchase foods from takeaway outlets at least once a week and 58% a few times a month.

Foods prepared outside the home are generally considered to be higher in salt than meals cooked at home, and it has been estimated that approximately 15% of the UK's salt intake is from foods eaten outside the home (Guthrie, Lin, & Frazao, 2002; He et al, 2010). However, the majority of previous studies have focused on fast or processed food (products bought from fast food chain outlets or supermarkets) only, not taking into account other out of home meal options such as takeaway food (Webster et al, 2010; Ni Mhurchu et al, 2011). It has been reported that ethnic cuisine, especially Chinese and Indian, is one of the most popular types of takeaway foods in the UK (Mintel Report, 2009). Furthermore, sodium intake in Northeast Asia is extremely high and ranges from 4651 mg to 6267 mg per day (11.6 – 15.7 g salt per day) depending upon region, which reflects the traditional cooking practices such as using monosodium glutamate, pickles, soy sauce and other sauces which contain sodium (Anderson et al., 2010; Brown et al, 2009). It may be expected that meals prepared in oriental takeaway outlets in the UK also contain a high level of sodium.

Taking into account the high prevalence of takeaway food consumption and a lack of information regarding nutritional quality of takeaway meals, there is an urgent need to determine the nutritional content of takeaway dishes. Therefore, the aim of the present study was to evaluate salt levels in popular hot takeaway meals from small, independent outlets in the Merseyside and Wirral region, UK.

Materials and methods

Collection and analyses of takeaway meals

For the purpose of this study, a takeaway meal was defined as food purchased from out of home food outlets or ordered for home delivery, which was ready for immediate consumption and not eaten in outlets. Takeaway meal samples were collected between December 2005 and January

2006 from small, independent takeaway establishments (Indian, Chinese, Kebab Shop, Pizza Shops and Fish & Chips Shops) within the Liverpool boundary by Liverpool City Council, Trading Standards and between July and September 2008 in Wirral Borough by Wirral Metropolitan Borough Council, Trading Standards Division. As part of the Trading Standards ongoing project work to investigate the nutritional quality of foods in their area, samples of takeaway food were collected from 215 outlets (140 and 75 from Wirral and Liverpool City Councils respectively). This is an approximate 50 and 20% representation of takeaway outlets from Wirral and Liverpool respectively (Evans, 2011; Liverpool City Council, 2011 – spoken data). A total of 411 samples of 23 different types of takeaway meals were purchased, with permission recently granted to the authors to use the data for publication. All meals were purchased once from each selected outlet.

All samples were frozen immediately after collection and stored frozen at – 18°C until analysis. Sodium concentration was determined by microwave acid (HNO_3) digestion followed by inductively coupled plasma optical emission spectrometry (ICP-OES) (Kira, Maio, & Maihara, 2004). Salt content was calculated from sodium concentration by multiplying by 2.542. The analysis was performed at Eurofins Laboratories ltd, Chester, UK and Eurofins Laboratories ltd, Birkenhead, Wirral, UK for Wirral and Liverpool Trading Standards respectively.

Statistical analyses

The data were analysed using SPSS version 17.0 (SPSS Inc., Chicago, IL, USA) and $p < 0.05$ was considered statistically significant. The adjusted significance level of 0.004 was used when multiple comparisons were made. The normality of distribution of analyzed variables was checked with histograms, Kolmogorov-Smirnov and Shapiro-Wilk tests. Due to non-normal distributions, data are expressed as medians with interquartile range (25^{th} and 75^{th} percentiles). The takeaway meals were classified into five groups according to their origin: 1. Chinese meals, 2. Indian meals, 3. English meals, 4. Pizzas, 5. Kebabs. Differences in salt levels between meal

125 categories and between different kinds of meals in the same category were tested with the use of
126 the Kruskal-Wallis test and the Mann Whitney U-Test. Salt levels in takeaway meals were
127 compared with the UK target of 6 g (Food Standards agency, UK, 2009).

128 **Results**

129 The median salt content in takeaway meal categories is shown in Table 1. Pizzas were
130 characterised by the highest salt content per portion (9.45 g (6.97-12.83), followed by Chinese
131 meals (8.07 g (5.47-10.99g)), Kebabs (6.21 g (4.01-8.35)) and Indian meals (4.73 g (3.61-6.10)).

132 Chinese meals had the highest salt density (7.4 g / 1000 kcal (5.49-10.76)) amongst all
133 analysed takeaway meal categories (p<0.001). The salt content in English takeaway foods was
134 significantly lower (p<0.001) than the salt content in the other categories, and this was observed
135 for comparisons made per 100 g, per portion and per 1000 kcal.

136 In addition, significant differences in the salt content between meals in the same category
137 were reported (Table 2) emphasising the difference between the lowest and highest salt content
138 between meals. Results showed, an overall significant difference within Chinese, Indian, English
139 and Kebab meals with amount of salt per meal, salt per 1000 kcal and comparison with Food
140 Standards Agency, UK, (2006) target ($p < 0.05$); Chinese, Indian and English meals also showed
141 significant differences between meals with salt per 100 g ($p < 0.05$), Chinese, Indian and Kebab
142 meals showed significant differences between portion sizes ($p < 0.05$). Mann Whitney U tests
143 revealed remarked differences in Chinese meals; sweet and sour chicken with boiled rice
144 contained almost four times less salt than a meal of beef, green peppers and blackbean sauce with
145 fried rice or chicken satay with fried rice ($p < 0.005$). Furthermore, some Chinese meals contained
146 more than three times the UK salt target, e.g. a single portion of beef and black bean with fried
147 rice contained 27 g of salt and a single portion of prawn chow mein contained 21 g of salt per
148 portion (Figure 1). This pattern was similar for Indian takeaway meals, where a portion of chicken
149 tikka massalla with keema rice had a salt concentration approximately 50% higher in comparison

150 with the other Indian meals ($p < 0.005$); however, the salt level did not vary significantly between
151 pizzas (regardless of the different toppings). It is important to note that the median portion size
152 for Chinese meals was significantly higher, than English, pizza and kebab meals ($p < 0.001$)
153 (Table 1, Figure 2) which could account for the higher levels of salt in the above mentioned
154 Chinese meals.

155 None of the 23 analysed takeaway meal types contained less than one third of the UK salt
156 target of 6 g per day (Food Standards Agency, UK, 2009), and the average meals provided from
157 37 to 216% of this target (Table 2). The median salt content per 100 g of different kinds of pizzas
158 and kebabs substantially exceeded the 2010 Food Standards Agency targets for recommended salt
159 level of 1.2 g per 100 g for pizzas and 1 g per 100 g for kebabs (Food Standards Agency, UK,
160 2006). Similarly, the median salt content of only one of the Chinese meals contained less than 0.6
161 g of salt per 100 g, the UK target for meat based takeaways (Food Standards Agency, UK, 2006),
162 but at the same time four other Chinese meals had a salt level almost 200% higher than this target.
163 The median salt content per 100 g met the Food Standards Agency (UK, 2006) criteria for English
164 takeaway meals only (0.5 g per 100 g); however, due to extremely large portion sizes (748 g (653-
165 837)) (Table 2; Figure 2) meals supplied an excess amount of salt, for example chicken and chips
166 contained 2.20 g (1.79-3.18); fish and chips 3.0 g (2.41-4.77); and mushroom omelette and chips
167 3.77 g (2.16-5.55)).

168 **Discussion**

169 The results of the present study indicate a very high level of salt in hot takeaway meals in
170 the UK. It was observed that a single portion of an average takeaway meal contained more than
171 half of the Food Standards Agency, UK, (2009) target of 6 g per day of salt, with some meals
172 providing more than 200%. In addition, 60% of the analysed meals were characterised by
173 extremely high salt density, and provided about 6 g of salt per 1000 kcal. It should also be noted
174 that chips were analysed without added salt, therefore it can be expected that the salt

concentration in English meals may be higher, as many people add salt to chips (North & Neale, 1995).

Although no current data exist regarding salt content in takeaway foods purchased from small independent outlets in the UK, a high salt level in other popular out of home meals seems to be common in other countries. Lachat et al. (2009) reported in Belgium that a typical lunch purchased from various catering establishments or from university canteens contained about 3.1 g of salt. Similarly, a recent Denmark study of canteen and fast food meals found salt content ranged from 8.2 to 11.3 g per portion of pizza, and an average hot meal eaten out of home provided 4.3 g of salt (Rasmussen et al., 2010). These findings were also in agreement with the results of Johnson et al. (2010) who, based on information posted on company web sites, analysed a nutritional profile of lunchtime fast food from major US fast food chains. The average pizza contained more than 6 g of salt per portion with a mean salt density of 5 g per 1000 kcal.

Salt and other sodium containing seasonings are ubiquitous components of diets around the world and many people believe that salt enhances the palatability of foods (Mattes, 1997). Some studies indicated that salt may possess addictive properties, and it has been reported that salt taste preferences are highly dependent on the salt level in the diet (Tekol, 2006). It can be suggested that continuous exposure to salty foods may alter the salt taste preferences and lead to the overconsumption of sodium. Kim et al. (2009) observed that Korean adolescents who were more likely to visit fast food establishments had a significantly higher preference for salt taste.

Due to both high sodium concentration and high sodium density, takeaway foods may significantly contribute to daily sodium intake from just a single meal. The results of a study by Clemens et al. (1999) showed that women who reported eating out of home more than six times during the week had significantly higher sodium intake than individuals who ate away from the home less frequently. Findings were similar among US adults and children where fast food

consumption was associated with significantly higher sodium intake ((Paeratakul, Ferdinand, Champagne, Ryan, & Bray, 2003; Haines, Hungerford, Popkin, & Guilkey, 1992).

It has been reported that lowering of salt intakes by only 10% has resulted in an approximated reduction of 6000 CVD related deaths in the UK, which has had a substantial impact on the UK economy with a saving of approximately £1.5 billion per annum (NICE, 2010). However, considering that about 80% of daily salt intake comes from processed foods and food eaten away from the home (Gilbert & Heiser, 2005; He et al., 2010), personal effort to reduce the sodium level in the diet may be disrupted by high salt concentration in commercial food (Brown et al, 2009). Therefore, only limited progress in the reduction of salt intake in populations can be made without changes in the salt level in commercially produced foods. Reduction of salt content in many food products in the order of 20 – 30% can be made without affecting the sensory acceptability and can remain unnoticed by the consumer (Dötsch et al., 2009). Therefore, a strategy of repetition of small reductions may be one effective tool for reducing salt intakes. In 2003, the UK Food Standards Agency began a programme to reduce the average salt intake of adults to 6 g per day by encouraging all sectors of the food industry to carry out reformulation work to reduce the salt content in their food products (Food Standards Agency, UK, 2010). The Food Standards Agency has developed targets for salt levels of various categories of food (Food Standards Agency, UK, 2006) and the revision of programme progress has shown that retailers, manufacturers, trade associations, caterers and suppliers to the catering industry have undertaken a significant amount of work to reduce the amount of salt added to foods during processing (Wyness et al, 2011; Shankar et al, 2012). While the UK's major catering chains see advantages of salt reduction and have declared collaboration, unfortunately there is no interest from small, independent catering outlets and none of them have joined the project (Food Standard Agency, UK, 2007). However, the current study showed that takeaway meals from small establishments were characterised by extremely high salt content. In addition, it seems that there are no standard

procedures of food preparation in the small outlets as variability in the salt level across the same kind of meals have been found to be very high. As takeaway meals from these types of outlets are increasing in popularity (Mintel, 2009) and may be an important contributor to daily sodium intake for a substantial percentage of the population, a different government programme to encourage the reduction of salt levels in food prepared in the private catering sector is needed. As voluntary guidelines regarding salt reduction do not result in adequate changes, some statutory regulation to lower salt concentration in takeaway foods should be considered. The fact that salt is a cheap ingredient which can make food palatable at a very small cost may be one of reasons why the private catering sector are reluctant to cooperate (Food Standard Agency, UK, 2010). It also seems to be a fundamental issue in that small takeaway outlets should be provided training to improve food preparation procedures and nutritional knowledge of staff. Additionally, a possible strategy is the introduction of convenient and clear labels indicating salt content in takeaway meals. However, labelling the food products or menu with only the amount of nutrients and without any explanation leaves the responsibility of choosing the proper food products with the consumer and relies on their nutritional knowledge. Therefore, nutritional labelling may not always be associated with desirable dietary changes. For example, Hoefkens et al. (2011) found that posting of nutrition information in university canteens did not effectively improve the nutritional quality of chosen meals. Similarly, the EATWELL project (Interventions to Promote Healthy Eating Habits: Evaluation and Recommendations) reported that posting point of purchase nutrition information had no effect on food choice (Brambila-Macias et al., 2011; Bhavani et al., 2012).

A different approach of labelling has been issued in Finland (Pietinen, Valsta, Hirvonen, & Sinkko, 2007). Food products must contain a 'high salt product' warning if salt content exceeds a maximum limit. If the salt level meets a set low salt limit, products may be voluntary marked as 'low salt product'. This approach makes it easier for the consumer to make proper choices even if

they are not sure about recommended daily salt intake, as they may use only 'low salt product' or 'high salt product' information.

The most effective strategy to reduce salt intake in populations should involve changes in the food environment, recipe reformulations, altering the food preparation process and consumer education. Recent studies from Australia (Grimes, Riddell, & Nowson, 2009) and UK (Food Standard Agency, UK, 2007) indicated that less than 50% of participants were concerned about the amount of salt in their diet and only 5% of them were able to correctly identify the current recommended daily salt intake (Grimes, Riddell, & Nowson, 2009).

Conclusion

The present study is one of the first designed to evaluate the salt content in hot takeaway meals from small independent outlets in the UK, and obtained results show that salt concentration in these kinds of food is alarmingly high. To enable the UK population to meet the recommended daily salt intake a significant reduction in the salt content of hot takeaway meals should be considered.

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372

373 Table 1 Salt content in analyzed take away meals by meal category

Meal Category*	Weight† g per meal	Salt† g per 100g	Salt† g per meal	Salt† g per 1000 kcal	Salt† %FSA↑
Chinese (*n*=92)	852 (728-947)^{c,d,e}	0.99 (0.70-1.37)^{b,c,d}	8.07 (5.47-10.99)^{b,c}	7.40 (5.49-10.76)^{b,c,d}	134 (91-183)^{b,c}
Indian (*n*=95)	803 (731-864)^{d,e}	0.61 (0.46-0.79)^{a,c,d,e}	4.73 (3.61-6.10)^{a,c,d}	3.61 (2.59-4.85)^{a,c,d,e}	79 (60-102)^{a,c,d}
English (*n*=95)	748 (653-837)^{a,e}	0.41 (0.30-0.59)^{a,b,d,e}	3.01 (2.23-4.48)^{a,b,d,e}	1.86 (1.33-2.79)^{a,b,d,e}	50 (37-75)^{a,b,d,e}
Pizzas (*n*=54)	676 (559-781)^{a,b,e}	1.47 (1.17-1.70)^{a,b,c,e}	9.45 (6.97-12.83)^{b,c,e}	5.28 (4.04-6.08)^{a,b,c}	157 (116-214)^{b,c}
Kebabs (*n*=75)	505 (436-711)^{a,b,c,d}	1.09 (0.89-1.40)^{b,c,d}	6.21 (4.01-8.35)^{c,d}	5.08 (3.98-7.99)^{a,b,c}	103 (67-139)^{c,d}

374 *n* = total number of meals; * data presented as median (interquartile range).
375 † Significant difference between all meal categories ($p < 0.001$; Kruskal-Wallis test).
376 Significant difference ($p < 0.001$; Mann-Whitney's test) of paired comparison of meal categories [a] Chinese; [b] Indian; [c] English; [d]
377 Pizzas; [e] Kebabs.
378 ↑ FSA target, 6 g salt per day (Food Standards Agency, UK, 2009)

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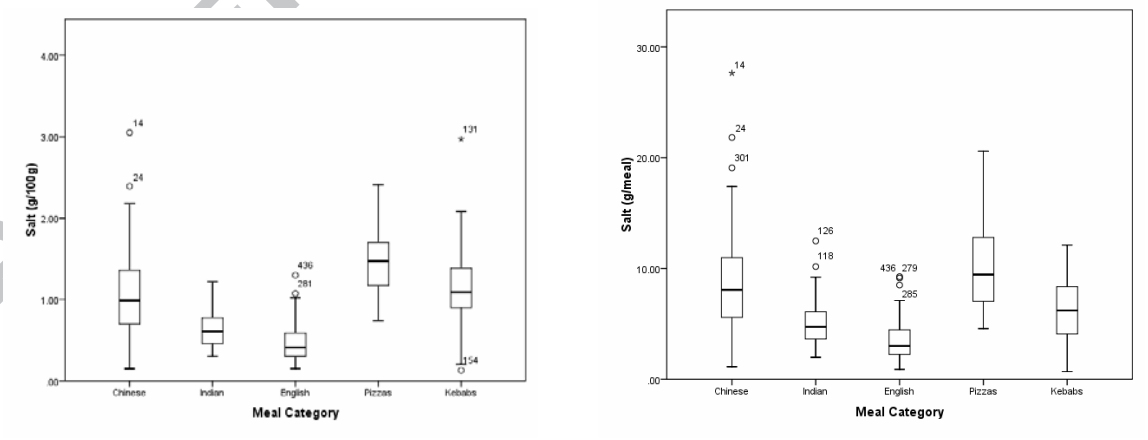
380 Figure 1 Variation in salt content in different meal categories



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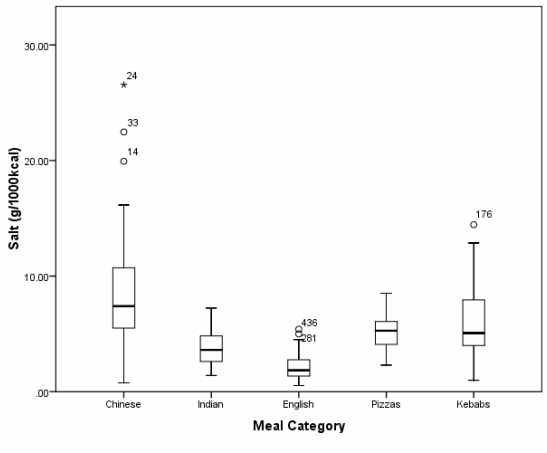

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383 Figure 2 Variation in portion size for different meal categories

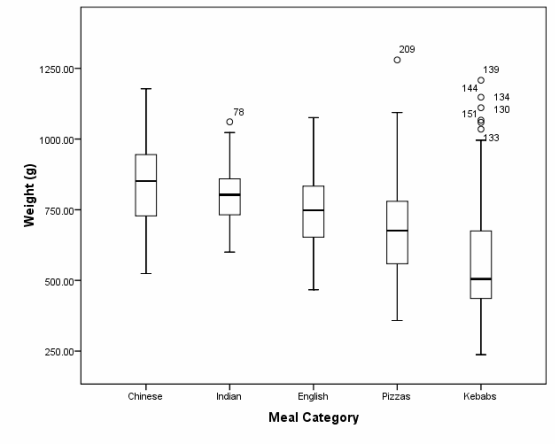

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Table 2 Salt content in different types of takeaway meals

Meal type*	*n*	Weight g per meal	Salt g per 100g	Salt g per meal	Salt g per 1000 kcal	Salt %FSA[↑]
Chinese [i,ii,iii, iv, v]						
Beef green peppers and blackbean sauce with fried rice	31	915 (871-1013)[a]	1.19 (0.91-1.50)[a,b]	10.72 (8.13-13.88)[a,b]	7.88 (6.04-10.8)[a,b]	179 (136-231)[a,b]
Prawn chow mein	21	679 (584-834)	1.12 (0.80-1.51)[a,b]	7.88 (5.58-9.99)[a]	11.97 (7.65-14.99)[a,b]	131 (93-167)[a]
Sweet and sour chicken with boiled rice	10	766 (744-868)	0.37 (0.27-0.49)	3.13 (1.83-3.76)	2.19 (1.65-2.52)[b]	52 (31-63)
Char siu chow mein	10	716 (680-848)	1.05 (0.97-1.25)[a]	8.07 (7.18-8.46)[a]	8.29 (6.37-10.37)[a]	134 (120-141)[a]
Chicken satay with fried rice	10	891 (781-1063)	1.04 (0.81-1.51)[a,b]	10.3 (7.53-13.38)[a,b]	7.12 (6.04-10.39)[a]	172 (125-223)[a,b]
Kung po king prawns with boiled rice	10	882 (794-931)	0.62 (0.39-0.85)	5.45 (3.51-7.37)	5.42 (3.14-6.63)[a]	91 (59-123)
Indian [i,ii,iii,iv,v]						
Lamb bhuna with chips	22	745 (714-830)	0.51 (0.38-0.65)[c]	4.12 (3.10-5.14)[c]	2.53 (1.84-3.37)[c,d]	69 (52-86)[c]
King prawn rogan josh with pilau rice	22	772 (701-828)	0.59 (0.48-0.74)[c]	4.20 (3.44-6.08)[c]	4.93 (3.57-5.97)	70 (57-101)[c]
Chicken tikka massalla with keema rice	21	808 (746-872)	0.81 (0.70-0.97)	6.68 (5.64-8.18)	4.22 (3.75-5.68)	111 (94-136)
Lamb rogan josh with pilau rice	10	758 (719-857)	0.46 (0.37-0.57)[c]	3.49 (2.78-5.23)[c]	2.81 (2.05-3.16)[c,d]	58 (46-87)[c]
Chicken korma with pilau rice	10	869 (819-923)	0.45 (0.37-0.54)[c,d]	3.81 (3.18-4.35)[c,d]	2.54 (1.98-2.95)[c,d]	64 (53-72)[c,d]
Vegetable biryani	10	834 (747-910)	0.69 (0.55-0.78)	5.63 (4.77-6.47)	4.11 (3.55-5.62)	94 (79-108)
English [ii,iii, iv, v]						
Chicken and chips	22	714 (641-847)	0.35 (0.22-0.44)	2.20 (1.79-3.18)	1.47 (0.98-1.99)	37 (30-53)
Fish and chips	52	745 (654-793)	0.43 (0.33-0.63)	3.00 (2.41-4.77)	1.90 (1.51-2.86)	50 (40-80)
Mushroom omelette and chips	21	783 (662-917)	0.48 (0.31-0.66)	3.77 (2.16-5.55)	2.51 (1.53-3.16)	63 (36-92)
Pizzas [i]						
Pepperoni pizza	11	770 (646-864)	1.65 (1.14-1.88)	12.94 (7.26-13.82)	5.79 (3.85-6.20)	216 (121-230)
Seafood pizza	11	765 (690-971)	1.32 (0.99-1.83)	11.09 (8.66-13.62)	5.28 (3.87-7.29)	185 (144-227)
Margherita pizza	12	674 (575-740)	1.40 (1.06-1.70)	8.83 (6.63-10.81)	4.75 (3.43-5.58)	147 (110-180)
Ham and pineapple pizza	10	558 (497-605)	1.44 (1.21-1.57)	7.72 (5.37-9.75)	5.39 (4.48-6.15)	129 (89-163)
Meat pizza	10	641 (554-767)	1.46 (1.26-1.57)	8.59 (7.44-10.57)	5.14 (4.41-5.55)	143 (124-176)
Kebabs [i,iii,iv,v]						
Donner kebab and chips	32	751 (561-979)	1.07 (0.84-1.22)	7.50 (5.90-9.71)	4.02 (3.48-4.75)	125 (98-162)
Chicken kebab	22	481 (436-539)[e]	1.15 (0.91-1.42)	5.94 (3.95-7.27)	7.55 (5.19-9.31)[e]	99 (66-121)
Shish kebab	21	386 (334-478)[e]	1.17 (0.91-1.51)	4.27 (3.47-5.99)[e]	7.12 (5.61-8.95)[e]	71 (58-100)[e]

n = number of meals; [*]data presented as median (interquartile range).

Significant difference within meal categories ($p < 0.05$; Kruskal Wallis test):

[i]Weight (g per meal); [ii]salt (g per 100 g); [iii]salt (g per meal); [iv]salt (g per 1000 kcal); [v]salt %FSA.

Significant difference between meal types within the same meal category ($p < 0.004$; Mann-Whitney's test):

Chinese: [a]Sweet and sour chicken with boiled rice; [b] Kung po king prawns with boiled rice; Indian; [c] Chicken tikka massalla with keema rice; [d] Vegetable biryani; Kebabs: [e] Donner kebab and chips (only statistically significant results were marked)

[↑] target, 6 g salt per day (Food Standards Agency, UK, 2009)

Determination of salt content in hot takeaway meals in the United Kingdom

Highlights

► high sodium intake is associated with numbers of negative health outcomes ► pizzas had the highest salt concentration per portion, followed by Chinese meals ► significant differences in salt content between meals in the same category were found ► results show that salt concentration in takeaway food is alarmingly high