A dietary and lifestyle worksite intervention to reduce high prevalence of overweight and obesity for London firefighters.

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INTRODUCTION

Overweight and obesity in UK firefighters are reaching epidemic proportions exceeding that of the UK general population ⁽¹⁾. This compromises physical fitness ⁽²⁾ and concomitant firefighter and public safety ⁽³⁾. Research has identified specific exposures related to firefighting ⁽⁴⁻⁵⁾, which may also contribute to uniquely high rates of coronary heart disease (CHD) and acute myocardial infarctions (MI) seen in this occupational group ⁽⁶⁾. These exposures include intense heat which could impair vascular function and increase thrombogenicity ⁽⁴⁾, and fire stations as obesogenic environments which perpetuate a culture of over-nutrition alongside increasing sedentary behaviour ⁽⁵⁾. Faced with a multitude of exposures, it is imperative that modifiable risk factors for CHD and MI are addressed. This however seems to have been overlooked by UK researchers thus far. We aimed to design, implement and evaluate the efficacy and feasibility of a fire station based dietary and lifestyle weight loss intervention for UK firefighters, factoring in a complex combination of exposures and firefighter specific cultural habits ⁽⁵⁾.

RESULTS

At baseline, 70% of the sample were classified overweight or obese by BMI (Harold Hill: 67%; Hornchurch: 74%). Post intervention, Hornchurch displayed significant mean reductions in BMI and BF% ($p=0.01$; $p=0.04$) respectively, and borderline non-significant improvement in WC ($p=0.06$). Harold Hill displayed a significant mean reduction in WC ($p=0.03$), but not for BMI or BF% (table 1). Table 2 displays post intervention dietary changes from baseline for the intervention group. Fig 1 illustrates that 4 Hornchurch firefighters crossed over into more desirable WC risk categories post-intervention. An attrition rate of 5% indicated a good level of programme feasibility.

DISCUSSION

To our knowledge, this study is the first to present data on overweight and obesity prevalence in London firefighters. It also represents the first nutrition and lifestyle worksite intervention study for firefighters in the UK. The reduction reported in total energy intake may suggest that portion control strategies, which were the overriding message of this intervention, were implemented successfully. This is especially relevant to firefighters due to the fire station culture of excessive food portions at mealtimes as identified in previous qualitative research⁽⁵⁾. These excessive worksite portions were modified via the reintroduction of smaller plates in the intervention station kitchen, which had been replaced by larger plates several years earlier. Future programs should therefore seek to utilise environmental modification where possible. Advice to limit butter, cheese, processed meats, red meat, total energy intake and high sugar products may have led to the reported reductions in SFA's, fats and oils, sugars, preserves and snacks. This result is especially important due to the exposure of shift work and its association with snacking on high sugar foods, which has been identified as a major fire station cultural problem⁽⁵⁾. The expected significant reductions in WC, total fat intake and sodium intake were borderline non-significant, which may be attributable to study limitations of the small sample size and a limited intervention duration. This trial showed efficacy and feasibility.

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METHOD

Forty London firefighters were recruited via staff email in February 2017. Thirty-eight firefighters (35 males, 3 females; mean age=44.8, SD=7.2) from 2 London fire stations (Hornchurch: intervention, Harold Hill: control) completed the one-month, cluster-controlled dietary and lifestyle intervention which ran February to March 2017. Hornchurch firefighters received the programme involving a face-to-face personalised information session; general information sheet; midway face-to-face support session; and nutritionist support throughout. Informational components focussed on fire station obesogenic environmental modification alongside nutrition, physical activity and lifestyle education in a low-cost/low-intensity/low-participant burden format. All firefighters were assessed at baseline and post-intervention for Body Mass Index (BMI), Body Fat Percentage (BF%) and Waist Circumference (WC). Dietary assessment was carried out using the EPIC-Norfolk Food Frequency Questionnaire ⁽⁷⁾.

Table 1: Changes in anthropometric measurements.

	Harold Hill (Control) (n = 18)			Hornchurch (Intervention) (n = 20)			Total (n = 38)		
	Mean	(SD)	Diff	Mean	(SD)	Diff	Mean	(SD)	Diff
BMI (kg/m ²)	25.8	(2.3)	- 0.2	27.5	(3.6)	- 0.4*	26.7	(3.1)	- 0.3*
Body fat (%)	21.4	(4.9)	- 0.4	22.2	(6.4)	- 0.9*	21.8	(5.6)	- 0.7*
Waist circumference (cm)	90.4	(6.9)	- 0.8*	95.8	(12.3)	- 1.4	93.2	(10.4)	- 1.1*

Abbreviations: SD = standard deviation; BMI = body mass index; Diff = difference from baseline.
*statistically significant ($p < 0.05$).

Fig. 1: Bar charts illustrating WC risk category changes between baseline and post-intervention. The left hand chart represents baseline prevalence levels. The right hand chart represents post-intervention prevalence levels.

Table 2: Changes in dietary behaviour variables. No control group existed for dietary intakes (n = 20).

Nutrient / food group	Baseline		Post-intervention		diff	p value
	median	(IQR)	median	(IQR)		
Energy (kcal)	2197	(1484)	1784	(799)	- 412.6*	.04*
Saturated fatty acids (g)	28.5	(24.6)	25.0	(16.9)	- 3.5*	.01*
Fats and oils (g)	12.9	(25.5)	9.7	(9.7)	- 3.2*	.03*
Sugars, preserves and snacks (g)	43.7	(62.4)	19.6	(46.8)	- 24.1*	.02*
Cereal products (g)	244	(229)	208	(166)	- 36*	.04*
Fruits (g)	152	(306)	224	(350)	+ 72	.07
Vegetables (g)	286	(220)	276	(253)	- 10	.59
Carbohydrate - total (g)	233	(120)	192	(113)	- 41	.09
Fat - total (g)	84.9	(67.5)	67.3	(29)	- 17.6	.06
Protein (g)	103.6	(57.8)	101	(41.1)	- 2.6	.54
Sodium (mg)	2850	(1435)	2695	(1158)	- 156	.06

Abbreviations: IQR = interquartile range; diff = difference between baseline and post-intervention medians.

* Statistically significant ($p < 0.05$).