



Development and validation of a novel food frequency questionnaire for UK firefighters

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Prevalence of overweight and obesity in UK firefighters may exceed that of the general population ⁽¹⁾. UK Firefighter dietary behavior has recently been investigated in a fire station-based dietary intervention pilot trial ⁽¹⁾, which utilised the EPIC-Norfolk food frequency questionnaire (FFQ) ⁽²⁾. Although this was able to detect significant dietary changes ⁽¹⁾, participant feedback identified it as burdensome. Furthermore, it was validated for a different population group, therefore its validity for assessing firefighter diets is unknown. We developed and tested the validity and reproducibility of the UK's first firefighter FFQ (FF-FFQ).

In June 2019, the EPIC-Norfolk FFQ was completed by 180 London firefighters. The thirty least consumed food items (reported mean intakes of never or less than once/month) were removed. A question on takeaway food consumption was added, as fieldwork suggested takeaways to be regularly consumed. The resulting FF-FFQ amounted to a six-page document (reduced from eleven). This was successfully pre-tested on a firefighter focus group who found it understandable and acceptable. Its relative validity was then tested against three multi-pass 24 hr. recalls, collected over a four-month period (June–November 2019) on a sample of $n = 69$ firefighters.

Correlations between the methods were medium and significant ($p < 0.01$) for energy ($r = 0.42$), carbohydrate ($r = 0.42$), protein ($r = 0.42$), fat ($r = 0.43$), fibre ($r = 0.49$), saturated fat (SFA) ($r = 0.45$), monounsaturated fat (MUFA) ($r = 0.32$), vitamin C ($r = 0.33$) and sodium ($r = 0.32$), but weak for polyunsaturated fat (PUFA) ($r = 0.24$, $p = 0.05$). This is consistent with a review of FFQ validation studies ⁽³⁾ which found correlation coefficients averaged between 0.4–0.5 when comparing a reference method with FFQs which display a specified portion size, but lower (0.2–0.5) when no portion size was specified. Similar to the EPIC-Norfolk FFQ, the FF-FFQ displays clearer portion sizes for some food groups than for others, which may explain the lower correlations for MUFA, PUFA, vitamin C and sodium. Bland-Altman analyses indicated good agreement between methods for energy and each nutrient, with an average of 96% of cases falling between the limits of agreement.

The FF-FFQ was also tested for reproducibility ($n = 72$). Comparisons were made between dietary intakes recorded by the FF-FFQ on two occasions, four months apart. Correlations were strong and significant ($p < 0.01$) for energy ($r = 0.75$), carbohydrate ($r = 0.8$), protein ($r = 0.62$), fat ($r = 0.69$), SFA ($r = 0.66$), MUFA ($r = 0.71$), PUFA ($r = 0.7$), fibre ($r = 0.71$), vitamin C ($r = 0.69$) and sodium ($r = 0.74$). Bland-Altman analyses also indicated good agreement between administrations indicating good precision, suggesting usefulness for detecting temporal dietary changes.

Showing reproducibility along with an overall acceptable level of relative validity, the FF-FFQ has demonstrated utility for its primary uses as both a screening tool to indicate high/low intakes of certain foods, and as a method for measuring dietary changes elicited by an intervention. This represents the first FFQ validation study for UK firefighters.

1. Lessons GR, Bhakta D (2018) *Proc Nut Soc* 77, OCE1, E21
2. Bingham SA, Welch AA, McTaggart A *et al.* (2001) *Public Health Nutr* 4, 3, 847–858
3. Cade J, Thompson R, Burley V *et al.* (2002) *Public Health Nutr* 5, 4, 567–587