



Determinants of nutrition practice and food choice in UK construction workers.

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Determinants of nutrition practice and food choice in UK construction workers.

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Journal section

Original articles – qualitative research (focus groups) exploring determinants of nutrition practice and food choice in UK construction workers

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Ethics

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Abstract (246 words)

The workplace is considered an effective setting for health and wellbeing interventions, including programmes focusing on nutrition, and provides opportunities to tailor programmes to meet the specific needs of industry and employees. This study explored nutrition practices amongst construction workers and managers to inform the design of a nutrition intervention. Five focus groups were conducted on three construction sites: two with managers (n=11), three with workers (n=27). Construction workers and managers identified several unhealthy nutrition related behaviours, including high consumption of convenient and fast foods, excessive coffee, alcohol, energy drinks, and low fruit and vegetable intake. These behaviours were often attributed to high workloads, long working hours and physically demanding jobs. Snacking and skipping meals were repeatedly reported, attributed to short breaks and poor accessibility to food outlets. The nutritional quality of meals differed between individuals (homemade vs fast food), depending on the type of sites (temporary vs permanent) and site location. Nutrition knowledge, establishing routines, meal planning and preparation were recognised as important in sustaining healthy nutrition habits. However, meal

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3 preparation depended on the facilities available, which differed between managers and workers,
4 highlighting the complex relationship between the workplace context and eating behaviours.
5 Construction workers were interested in learning about nutrition and improving their eating habits
6 through a nutrition intervention. However, they highlighted that better cooking and storage facilities
7 on site, together with fewer jobs demands and longer break times, would enhance the sustainability
8 of the intervention and their ability to make healthier food choices.
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15 **Article (6917 words)**

16 17 18 **Introduction**

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20 Protecting and promoting the health, safety and wellbeing of workers, by improving the working
21 environment and undertaking health promotion initiatives, has been recognised as a priority by the
22 European Agency for Safety and Health at Work (2020) and the World Health Organization (1994). In
23 the UK, a recent Chartered Institute of Personnel and Development report (2020) highlighted that
24 more organisations are taking a strategic approach to improving the health and wellbeing (H&W) of
25 employees (44% vs 40% in 2019). However, the emphasis is on helping employees who have become
26 ill, rather than on prevention, with 41% of respondents (n=1018) reporting more reactive than
27 proactive organisational practices.
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35 The workplace has been identified as an effective setting for H&W interventions, including nutrition
36 programmes (Hutchinson & Wilson, 2012; Meng *et al.*, 2017), because it influences health and health
37 behaviours, such as food choices, through providing or limiting access to facilities (e.g. canteens or
38 vending machines), influencing health risks (e.g. through stressful jobs, long working hours), health
39 attitudes (e.g. health supporting culture), and providing health promotion opportunities (e.g. health
40 checks) (Quintiliani *et al.*, 2010; Bonnell *et al.*, 2017). Moreover, it has the potential to eliminate
41 barriers to participation, including a need for transportation and conflicting family responsibilities
42 (Brown *et al.*, 2018). However, given the likely role of the workplace in determining the H&W of
43 individuals, workplace H&W programmes should be designed for specific jobs, industries (Quintiliani
44 *et al.*, 2008; Carmichael *et al.*, 2014) and countries, due to distinctive cultural, business and policy
45 environments (Carmichael *et al.*, 2014).
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55 Working patterns and employment structures differ by country, for example, the Organisation for
56 Economic Co-operation and Development (2019) found that the highest average number of annual
57 hours worked per worker are in Mexico (2137), with the lowest in Denmark (1380), Norway (1384)
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3 and Germany (1386), and the UK estimated at 1538. This equates to a European weekly average of
4 41.2 hours (full-time equivalent) compared to 42.5 in the UK (Eurostat, 2020). Countries also vary in
5 employment structures, for example, in the UK there are approximately 13.5% self-employed persons
6 (n=4,375,000), compared to 86% employed (Office for National Statistics (ONS), 2021), while
7 proportions are almost equal in Latin American countries (e.g. Honduras – 52% employed; 48% self-
8 employed) (Aleksynska *et al.*, 2019).
9

10 Globally, construction is a leading industry, accounting for more than 10% of Gross Domestic Product
11 (GDP), employing around 7% of the workforce (approx. 273m+ people) (Sertyeşilişik, 2016), and was
12 estimated to be worth \$10.8 trillion in 2017 (Meisels, 2020). In the EU, the sector provides 18 million
13 direct jobs and contributes approximately 9% of the EU's GDP (European Commission, 2020). In the
14 UK, it accounted for 6% of total economic output in 2017 (Rhodes, 2018) and 7% of workforce in 2019
15 (Health and Safety Executive (HSE), 2020).
16

17 Construction workers are often referred to as “blue-collar workers” and defined by their physical
18 labour component (Lips-Wiersma *et al.*, 2016), typically in low ranked positions (Lucas & Buzzanel,
19 2004) and paid by the hour or by piece rate based on the amount of work completed (Wilkie, 2019).
20 Workers in the UK construction have been found to experience a high number of work-related injuries
21 and occupational health problems (HSE, 2020; ONS, 2019). Annually, around 81,000 construction
22 workers suffer from work-related ill health: 57% musculoskeletal disorders, 26% mental health issues,
23 followed by lung disorders and cancers (HSE, 2020). Furthermore, stress and anxiety due to working
24 in high pressured and dangerous environments are common health consequences (HSE, 2020), with a
25 survey (n=3400) showing that 25% were considering leaving the industry in the next 12 months for
26 this reason (Randstand, 2017).
27

28 Workplace injuries and ill health have serious effects on individual workers, their families, employers,
29 government, and the wider society, with the impact expressed as financial (lost input and healthcare)
30 and non-financial, ‘human’ costs (the quality of life or loss of life) (HSE, 2020a). HSE (2020a) estimated
31 the total costs of workplace self-reported injuries and ill health in 2018/19 to be £16.2 billion. Over
32 half the total cost (£9.56 billion) fell on individuals, whilst the remainder was shared between
33 employers (£3.16 billion) and government / taxpayer (£3.50 billion). Human costs accounted for
34 almost all the individual costs (£9.3 billion) arising primarily from loss of employment income (HSE,
35 2020a). In UK construction, the economic cost of workplace injury and new cases of work-related ill
36 health were estimated at £1,062 million in 2016/17, accounting for 7% of the total cost across all
37 industries (HSE, 2018). However, the above calculations focus solely on financial ill-health costs,
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3 ignoring the impact of difficult issues to quantify (e.g. wellbeing, happiness, life experience, conditions
4 with a long latency, itinerant workforce, high self-employment rates, masculine cultures, and the
5 stigma around ill-health), and undoubtedly leading to an underestimate of the real costs (Randstand,
6 2017; Gibb *et al.*, 2018).
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11 Overweight and obesity are one of the long latency conditions of concern among construction workers
12 (HSE, 2016). This is associated with cardiovascular problems, increased levels of diabetes and
13 musculoskeletal disorders, as well as implications for safety at work, as obese workers are more likely
14 to encounter difficulties when using equipment and doing strenuous activity (HSE, 2016). The
15 magnitude of the problem was highlighted during the Olympic Village build, whereby a health check
16 identified that 29% of site workers had hypertension, 40% were overweight and 28% obese (Tyers &
17 Hicks, 2012). A range of factors are associated with obesity, e.g. sedentary lifestyles, poor sleep, and
18 the high consumption of energy-dense and processed food (Hruby & Hu, 2015), alongside
19 environmental factors (e.g. increased availability, accessibility, affordability and marketing of energy
20 dense food) (Hobbs & Radley, 2020). Whilst sedentary behaviour is less likely to be a contributory
21 factor for construction workers, environmental factors that “undermine the self-regulatory capacity
22 that people have to make responsible decisions about personal diet and physical activity” (Hobbs and
23 McKenna, 2019, cited in *ibid*, p.1) are plausible reasons for weight gain amongst this population.
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34 Undesired, unhealthy behaviours in construction include alcohol and drug consumption, smoking (50+
35 cigarettes a day) and gambling (Oswald & Turner, 2017; Sherratt & Turner, 2018), with some being
36 attributed to low socioeconomic status and low education level (Lingard and Turner, 2015), and the
37 latter also associated with obesity (Cohen *et al.*, 2013; Queiroz Bortolozo *et al.*, 2016). In addition,
38 construction workers have little knowledge of nutrition and consume energy-dense foods in the belief
39 that this will enable them to undertake physically-demanding jobs (Men’s Health Forum (MHF), 2009;
40 Viester *et al.*, 2012).
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47 Blue collar workers’ food habits are influenced by their colleagues; they can be peer pressured to
48 make unhealthy choices (e.g. meals consumed communally are based on a majority decision) or
49 supported in healthy behaviours, like taking up exercise or eating healthily (Bonnell *et al.*, 2017;
50 Mazzola *et al.*, 2017). Workers also socialise around food, however, this creates divisions as the same
51 occupational groups eat together, often in lunch settings determined by their status (Naweed *et al.*,
52 2017; Wandel & Roos, 2005).
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3 Job demands affect workers' food choices, with intensive workloads, inflexible schedules, long
4 working hours (even 70+ hours), stress and being 'under-pressure', all leaving employees feeling that
5 they lack time, energy, motivation to make healthier choices (Mazzola *et al.*, 2017; Naweed *et al.*,
6 2017) or using food to deal with stress, by either comfort eating, turning to convenient, processed
7 foods, or undereating (Nobrega *et al.*, 2016). Too short or infrequent breaks are also common barriers
8 to healthy eating (Nea *et al.*, 2017; Nobrega *et al.*, 2016), with workers struggling to buy or prepare
9 meals or avoiding fluids due to difficulties taking bathroom breaks (Nea *et al.*, 2017).

10
11 The workplace environment affects workers' lifestyle, determines their health behaviours (Demou *et al.*
12 2018) with factors such as cost, time to eat and the availability of healthy food exerting an impact
13 on food choices (Thomas *et al.*, 2016). Onsite barriers to healthy eating include a lack of healthy eating
14 options, poor canteen facilities (including insufficient seating, unhygienic surrounds, poor food-
15 making and food-storage facilities) (Mazzola *et al.*, 2017; Nea *et al.*, 2017). Furthermore, food choices
16 are influenced by site location, with limited food outlets available around remote sites (Wandel &
17 Roos, 2005).

18
19 Earlier research found that although healthier foods are considered to be expensive by workers
20 (Pridgeon & Whitehead, 2013; Thomas *et al.*, 2016), there is a growing interest in nutrition, and blue
21 collars welcome workplace changes being made to improve their H&W (Eaves *et al.*, 2016; Nea *et al.*,
22 2017). However, improving health might be more complicated in male dominated industries, such as
23 construction, as unhealthy behaviours are sometimes adopted to demonstrate masculinity (Naweed
24 *et al.*, 2017; Wandel & Roos, 2005).

25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 **Study aim**

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42 This study is part of a phased research project, which sought to 1) explore the perceptions of
43 construction workers and managers of current nutrition practices in the workplace, 2) explore barriers
44 and facilitators to healthy nutrition choices, and 3) design and evaluate an on-site nutrition
45 intervention. This paper focuses on phases 1 and 2, with the outcome of phase 3 being reported in a
46 future paper.

47 48 49 50 51 52 53 **Literature review**

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55 The literature search was conducted using PubMed, Web of Science, Scopus, Cochrane Library,
56 CINAHL, ProQuest, Science Direct, supported by findings from national reviews (Black, 2008;
57 Carmichael *et al.*, 2014; MHF, 2009; Public Health England (PHE), 2017) and supplemented with
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3 statistical information from the National Institute for Health and Care Excellence (NICE), ONS,
4 Eurostat, and the HSE. Where relevant, papers referenced by articles included in the review were
5 retrieved, read, and included. Search strategy is included in Supplementary material, Table 1.
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10 The literature review explored work-related factors influencing nutrition choices and eating behaviour
11 of 'blue-collar' (including construction) workers, where literature pertaining to this group was
12 included, due to the paucity of literature relating solely to construction workers. An overview of the
13 findings was presented in the introduction to this paper. A full summary of the literature review is
14 included in Supplementary material, Table 2, where findings are mapped against the theoretical
15 framework of this study, the Socio-Ecological Model (SEM).
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20 21 **Theoretical framework**

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23 The SEM has been widely used in health intervention research (Caperon *et al.*, 2019; Gale *et al.*, 2013;
24 Smith *et al.*, 2017), as alongside individual influences, it considers a variety of environmental factors
25 influencing behaviour (Golden & Earp, 2012). The model highlights how societal (e.g. policies, norms),
26 organisational (e.g. workplace, community), intrapersonal (e.g. social networks) and individual factors
27 (e.g. behaviours, attitudes, beliefs, knowledge) influence nutrition choices, and provides a framework
28 for understanding the dynamic interrelations between an individual and their environment, including
29 the context within which they exist (Stokols, 1996).
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38 **Methods**

39 Internally homogenous focus groups (FG) were used to explore: 1) stakeholder perceptions of current
40 nutritional practices, and 2) barriers and facilitators of healthy nutrition choices in construction
41 workplaces. Homogenous groups (separate groups for managers and workers) were selected to
42 facilitate more open conversation amongst participants (Gill *et al.*, 2008; Morgan, 1997), ensure
43 similar socio-economic and educational backgrounds, and allow the examination of differences in
44 perspectives between groups (Morgan, 1997). Managers and workers are important stakeholder
45 groups in relation to the acceptability and feasibility of workplace health interventions (De Cocker *et*
46 *al.*, 2015). Workers are recipients, therefore, their participation in the exploration stage might
47 positively influence the compliance and engagement with the intervention, whilst managers are the
48 decision-makers whose support is essential for the intervention implementation.
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56 FG were selected firstly, because they provide rich and detailed insights into "real world problems,
57 perspectives and potential solutions" (Gilson *et al.*, 2011, p. 43). Secondly, they are known to be
58 especially effective for exploring employees' perceptions and experiences if little is known about the
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3 topic (Kitzinger, 1995), and finally, dynamic group interaction enables the generation of large amounts
4 of detailed information (Bryman, 2012) in a relatively short period of time (Rabiee, 2004), which was
5 important as data collection took place during the working day.
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9 Guidelines on the optimal size of 6-8 participants per FG were followed, including over-recruitment
10 by approximately 20% to avoid the risk of having an unsatisfactory discussion (Gill *et al.*, 2008). The
11 number of FG was determined by the size of organisations and the organisational constraints (e.g.
12 room availability, workload, time allocated). For example, site A was small; of 12 workers, 9
13 participated in the FG. Site B was large, but due to a limited office space and the workload, we were
14 only provided with time to conduct 3 FGs. Site C had approximately 50 workers, 10 took part in the
15 FG, 7 more expressed an interest but failed to attend. The number of FGs was in line with other studies
16 exploring employees' perceptions as a part of the health intervention development, e.g., Brown *et al.*,
17 (2015) used 3 FGs, Muegge *et al.*, (2018) used 4, while for studies in construction, Peters *et al.*, (2020)
18 used 2 and Ross *et al.* (2021) used 6. An earlier study exploring dietary behaviours in construction used
19 5 FGs (du Plessis, 2011).
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29 Although organisational constraints, rather than data saturation, determined the number of FGs, a
30 recent systematic review assessing sample sizes for saturation suggested FG saturation occurred at
31 4-8 groups (Hennink & Kaiser, 2022). Similar findings were previously discussed by Guest *et al.* (2016),
32 who concluded that 2-3 FGs are sufficient to capture 80% of themes, and 3-6 for 90% of themes.
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38 Predetermined open-ended questions on current nutritional practices in the workplace and barriers
39 and facilitators to eating healthily at work were asked. A priori themes were identified from the
40 literature review, and questions were developed, in line with the research objectives with two
41 experienced senior workplace health researchers (see Supplementary material for FG Questions).
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46 The study's author was the interviewer, FGs were recorded, with permission, using an encrypted
47 digital recorder, and transcribed verbatim by professional service providers. Participants were
48 anonymised to ensure confidentiality. The field notes, taken immediately after the FG, were read with
49 the transcripts to ensure the context was fully considered (Phillippi & Lauderdale, 2018).
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53 The study was approved by the Research Ethics Committee of the University of Salford (HSR1819-
54 124).
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56 **Participants**

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3 Five FG (lasting 40-60 minutes) were conducted in 2020, on three different construction sites (A, B, C)
4 (in different companies); two with managers (n=11) and three with workers (n=27). Site A was small
5 (12-14 workers), with approximately 85% of the workforce living locally. Site B was a large site (300
6 workers), with a majority (70%) of the transient workforce. Site C was a medium-sized site (50-100
7 workers), with over half of the workforce living locally. Further information on the characteristics of
8 sites is available in the supplementary material (Table 3).
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15 Participants were recruited through organisational representatives, including HR, Health and Safety
16 and site managers. Information sheets and invitation letters were e-mailed via the representatives,
17 and participants were advised to contact the researcher directly, or advise their line manager if they
18 wanted to participate. The researcher was available on site to provide additional information on the
19 FG, including locations and times.
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24 To qualify for inclusion, participants had to be a construction worker, or a manager/supervisor, and
25 happy to share their experiences on nutrition practices and food choices at work. No other inclusion
26 or exclusion criteria were applied. Across three sites, 55 candidates expressed an interest in taking
27 part; 38 were included in the final cohort, and 17 failed to attend for various reasons (e.g. work
28 pressure, or having left the job). Participants provided written informed consent for the study. No
29 monetary compensation was offered; however, light refreshments were provided.
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35 **Qualitative analysis**

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38 FG data was analysed using Framework Analysis (FA); an increasingly popular approach in health
39 research (Gale *et al.*, 2013; Smith & Firth, 2011). FA uses a combined approach to analysis, enabling
40 themes to be developed inductively from the accounts (experiences and views) of research
41 participants and deductively (the inclusion of a priori themes) from existing literature (Gale *et al.*,
42 2013).
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47 Analysis consisted of 5 systematic and visible stages: familiarisation, identifying a thematic framework,
48 indexing, charting, and mapping and interpretation. This enabled the tracking of decisions, and
49 movement back and forth across the data until a coherent account emerged. Moreover, links between
50 the original data and findings could be maintained, adding to the rigour of the research process and
51 enhancing the validity of the findings (Furber, 2010; Smith & Firth, 2011). Data was coded by multiple
52 coders (MW, MC and AR) to ensure rigour. Microsoft Excel was used to organise data and synthesise
53 under themes.
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59 **Results**

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3 A total of 25 themes were identified in the literature of which 21 were common across the FG findings.
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5 Additionally, 8 new themes emerged, not previously identified in the literature. Themes were
6
7 organised using the SEM to enable easy comparison between work-related factors influencing
8
9 nutrition choices found in the literature and FG. A table showing the relationship between the
10
11 literature review themes and FG findings is available in the supplementary material (Table 4).
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14 **Individual factors related to the eating habits of construction workers**

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16 Weight problems were frequently mentioned by participants, with one manager highlighting a weight
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18 gain of almost five stone over a fifteen-year period. Another highlighted that whilst he could be
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20 successful at losing weight, he could not sustain this. Workers also highlighted the problem of
21
22 abdominal obesity (even in slim individuals), noting its association with visceral fat responsible for
23
24 health problems, and highlighting how this increase in 'belly fat' can be a wake-up call to improve their
25
26 lifestyle and nutrition.
27

28 *"Some of them [other workers on site] were really skinny, but they had quite high visceral fat,*
29 *and that was a bit of a wake-up call for them..." (FG4 workers)*
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33 Excess alcohol consumption and smoking were identified as common unhealthy behaviours in three
34
35 FG. While the amount of alcohol consumed was unspecified and most consumption was carried out
36
37 after work, there was a general feeling this was higher than recommended. Quitting smoking raised
38
39 concerns about weight gain.
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41 *"I went from smoking a packet of cigarettes a day to eating a packet of biscuits a day, when I*
42 *gave up" (FG4 workers)*
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46 The importance of sustaining good/high energy levels to aid alertness, concentration and enable
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48 workers to carry out physical jobs was emphasised across all FG. Food and coffee consumption were
49
50 highlighted as ways of achieving this, although there was debate about the role of high energy/sugary
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52 foods compared to protein foods, or slow releasing carbohydrates, with sugary diets being associated
53
54 with being "perpetually tired" and affecting workers' willingness to cook in the evenings.
55

56 *"But the key thing is, the industry is not like any other. None of my friends work from 7.00 until*
57 *6.30, so to keep you working at the rate you need to, personally I feel I need to have food, I*
58 *need to" (FG2 managers)*
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5 Nutrition knowledge was discussed in all FG, including an interest in learning about food, its impact
6 on the body and mind, as well as participants reporting limited understanding of healthy eating or
7 frequently forgetting about the healthy nutrition habits due to job demands. Participants offered
8 suggestions on how to recognise whether food is healthy or not, including: checking portion sizes,
9 sugar and salt content, preservatives, and using the traffic light system on food labels. They also
10 reported they considered food “looking healthy”, being “nutty”, avoiding processed foods, eating
11 fresh foods, cooking from scratch, having colourful foods on the plate and eating a variety of foods.
12 Younger workers were usually considered more knowledgeable about nutrition, however, a general
13 confusion caused by the media about what is healthy, as well as misleading information on food
14 packaging, was a concern for some.
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23 *“There is so much conflicting information about ... sugar is the enemy, then fat’s the enemy,*
24 *then carbs are the enemy” (FG2 managers)*
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28 The consumption of convenience foods, including fast food, ready meals, junk food and eating out
29 was repeatedly mentioned by participants due to limited food outlet accessibility, short break times,
30 lack of time to think about food when shopping, convenience in preparation (e.g. microwave heating)
31 and the need to stay satisfied for longer. Storage problems (i.e. a lack of space to keep food) on site
32 were also mentioned by workers from a large site for their reliance on pre-packed, non-perishable
33 foods.
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40 *“Straight into the shop, just grab ... you don’t tend to think about what you’re grabbing off the*
41 *shelf, you just think what’s easy to cook, what’s going to last longer and what’s going to fill*
42 *you up” (FG4 workers)*
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46 Most managers and workers reported that they frequently skipped meals. Poor accessibility to food,
47 short breaks, busy schedules or not being hungry were the most common explanations. None of the
48 participants showed awareness about how skipping meals affected their energy and concentration
49 levels.
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54 *“Sometimes you don’t eat at all. Sometimes you’re that busy you don’t eat at all so it can be*
55 *very varied” (FG3 managers)*
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3 The habit of snacking was discussed in all FG, however, differences in the nutritional quality of snacks
4 were noted, with some snacking on fruit and nuts, while others on crisps, chocolates, jam, bagels and
5 biscuits. Snacking was also considered a way to deal with monotony, with some reporting bingeing on
6 snacks like biscuits.
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11 *"I might have a biscuit, then lunch I might have a biscuit" (FG4 workers)*
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14
15 Workers in two FG highlighted the high consumption of energy (6 cans or more) and sugary drinks,
16 to sustain energy. This was highlighted as a general problem across UK construction sites, with
17 participants suggesting that workers replace meals with caffeinated drinks to *"to get through the*
18 *day"*.
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23 *"... So you smash an energy drink, I've seen it on other sites, up the river, people don't even*
24 *have lunch sometimes, they'll just have an energy drink just to get through the day, which, yes,*
25 *that's suits me but it's just full of sugar, it's absolutely packed" (FG1 workers)*
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30 At the same time, low intake of water was highlighted in three FG (workers only). Participants
31 replaced water with tea and coffee and keeping a bottle of water while on site was mentioned on
32 only one occasion.
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37 *"Coffee and tea, never water or juice" (FG5 workers)*
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40 An excessive consumption of tea and coffee, described as: *"plenty"*, *"too much"*, *"drinking all the*
41 *time"*, *"as much as I want"*, was discussed in four FG. Some workers reported having eight cups of
42 coffee daily, often with large amounts of sugar and milk, to keep energy levels up, especially as these
43 were free of charge, *"generously supplied"* by the company.
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48 *"I am happy with coffee. Keeps me awake" (FG1 workers)*
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51 A lack of personal resources, motivation, energy or the willpower to prepare food or pursue healthier
52 food choices, due to demanding and stressful jobs, was recognised by participants in four FG. *"Lazy"*
53 and *"cannot be bothered"* were frequent expressions.
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58 *"...for me just being lazy really, I like to eat all the healthy stuff but it does take time to prepare*
59 *it" (FG3 managers)*
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5 Discussions relating to fruit and vegetable intake received mixed responses, with some having
6 frequent consumption, while others did not, despite recognising their importance. The main barriers
7 to fruit and vegetable consumption were vegetables not providing sustainable energy and having to
8 rely on the food provided in rented accommodation. Workers who lived locally and brought packed
9 lunches from home seemed to struggle less in this respect.
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15 *“If you give me a plate of vegetables, I can eat those vegetables all day long and at the end of*
16 *the day I’m still thinking I’m still hungry” (FG2 managers)*
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19 Alongside the living arrangements of workers, the nature of the site (temporary or permanent),
20 location (distance to food outlets), and availability of storage facilities influenced the habit of bringing
21 a packed lunch from home, which often consisted of leftovers from the day before or a meal prepared
22 by a partner.
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27 *“Because they’ve got a big enough fridge to suit everybody here, depending on if people are*
28 *going home or whatever, people bring stuff” (FG1 workers)*
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32 The importance of meal planning and preparation was mentioned in three groups, with some
33 recognising the significance of planning meals, while others discussed a lack of motivation in staying
34 organised. Although participants appreciated the benefits of advanced meal preparation on their
35 health and nutrition choices (e.g. not relying on convenient fast food), they expressed concern about
36 the time it takes.
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42 *“You do fall into the trap of not being able to plan, and then it’s catching food on the fly and*
43 *getting a Burger King on the way up on the M1” (FG2 managers)*
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48 Next to meal planning, managers and workers from two construction sites discussed the value of
49 having healthy nutrition habits and difficulties in changing unhealthy ones. Working on permanent
50 sites, staying on the same site (even for a week), as well as good welfare facilities were recognised as
51 providing additional motivation to maintaining a healthy routine. Nonetheless, participants
52 highlighted that their shopping habits were often an automatic process led by the need to buy food
53 quickly, rather than considering its nutritional value.
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3 *"I can't remember the last time I didn't have this for lunch'. And it becomes a routine, and I*
4 *guess it's getting out of that mindset as well"* (FG4 workers)
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8 **Interpersonal factors related to the eating habits of construction workers**

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11 Construction workers in three FG talked about socialising at meals; eating, cooking together, and
12 sharing food (e.g. an 'around the world' Friday meal) as a convenient way to organise meals, stay
13 healthy and bring the team together. This was particularly prominent on sites where most workers
14 were not local, hence stayed in temporary accommodation during the week, with some clubbing
15 together to share the burden of shopping and meal preparation.
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21 *"We found it beneficial to get a syndicate if you like and then we buy, I'll go and buy food for*
22 *the week ..."* (FG3 managers)
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26 Nonetheless, occupational and cultural differences in socialising were reported, with workers of the
27 same status and profession or from the same country usually living, eating and spending time
28 together.
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32 Managers from two FG (on the same site) mentioned the pressure placed on those who use the work
33 kitchens to cook; feeling hassled when occupying facilities for too long, watched and judged, as well
34 as cooking considered by co-workers as an excuse not to work.
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39 *"The only issue in that kitchen there, it's like the main hub for everybody so everyone is in*
40 *there, so everyone is watching what you're doing. What you're trying to cook. You get people*
41 *trying to dip their fingers in your food and like 'oh what you doing there?'"* (FG3 managers)
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46 The differences between occupational groups (workers and managers) as well as employment status
47 (employees vs subcontractors) were visible in the facilities provided on the large site, where workers
48 and managers did not share the same welfare space (discussed in three FG conducted on the large
49 site). Similarly, potentially divisive differences were visible with regards to the wellbeing and health
50 opportunities, i.e. the Fresh Fruit Monday initiative was not available to subcontractors, while fitness
51 activities were designed for *"the same group of people"* – *"fitness freaks"*.
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57 *"I noticed here, at the main compound, there's a lot more in terms of food preparation*
58 *availability"* (FG4 workers)
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Organisational and community factors related to the eating habits of construction workers

There was consensus across all FG that it is difficult to have a nutritious meal within a short break (max 30 minutes), particularly as construction sites are usually in remote locations, therefore, food choices are determined by the proximity of food outlets, rather than food quality. This was especially the case for workers, as managers were more relaxed when taking their breaks and preparing food.

“I have lunch when I have the time for it, a window for it. The lads on site, they don’t have that. Half ten they’re coming for their break and they’ve got half an hour suddenly to try and do all this” (FG2 managers)

A short break and many workers using the same kitchen space further limited food preparation opportunities, even where good facilities are provided.

“If you’ve got thirty blokes going to canteen all wanting to do poached eggs, well you’re only going to get ten of them with a three-minute poached egg, aren’t you, until they have to go out again?” (FG2 managers)

Workers living in temporary accommodation, particularly those lacking food preparation or storage facilities, reported repeatedly eating out, having ready-meals and takeaways, or relying on non-perishable snacks in the evening. One worker even discussed storing his food outside the window or in the car during cold months due to a lack of suitable facilities. Additionally, accommodation might be far from local shops, town centres etc., limiting the range of foods that could be purchased if transport is unavailable.

“Where myself and a lot of others suffer is we go back to hotel accommodation where you don’t have cooking facilities. So you’re reliant on meals that are served to you, like at the hotel and stuff” (FG3 managers)

A well-equipped kitchen on site was reported to make food preparation, storage, and therefore healthier eating, easier, although the quality and quantity of facilities differed between sites and even cabins on the same site. For example, workers’ cabins were equipped with kettles and microwaves, while managers from the same site mentioned toasters, hot plates, ovens, slow cookers, fridges.

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3 *"I think the facilities we've got there are like nothing I've ever seen in a workplace before" (FG2*
4 *managers)*

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8 Furthermore, dirty cabins, the number of workers using the facilities simultaneously and safety
9 factors, e.g. rats, were limiting factors for food preparation, often only allowing the storage of food
10 for immediate consumption.
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15 *"Some of the sites, you might have 300 people in a canteen and you might not necessarily want*
16 *to use some of the stuff that's up for grabs" (FG1 workers)*

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20 While managers and workers from three FG declared cooking food on site, this was influenced by
21 break times, and the variety and number of facilities available; reflected in the nutritional quality of
22 meals prepared, which ranged from fast food meals heated in microwaves, to porridge and omelettes,
23 and even grilling a full chicken. Workers cooking on site were most often those who stayed in
24 temporary accommodation lacking in food preparation facilities.
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30 *"Fast food in terms of what we cook out in the kitchen like paninis" (FG3 managers)*

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33 High levels of stress, tiredness, and long working hours consistently affected eating practices both at
34 work and home, with some feeling *"sick and tired of work"*, and even thinking of leaving construction,
35 referred to as *"an industry like no other"*. Additionally, some declared eating fast food for comfort, or
36 skipping meals due to tight deadlines. However, participants from one group recognised that feeling
37 tired was not only due to job demands, but also poor diets.
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43 *"In the afternoon, you're not functioning properly and start thinking about leaving" (FG2*
44 *managers)*

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48 Workers expressed an interest in taking part in health checks (e.g. blood pressure and visceral fat
49 measures) and appreciated opportunities to get feedback on their health status (two workers groups),
50 suggesting that these should be conducted throughout the day to allow flexibility for attendees.
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55 *"Health checks. You could go during lunch, you could go after work, you could go before work,*
56 *and they would do a health check and make sure everything is alright like your blood pressure,*
57 *visceral fat [...] you're a bit more aware of your health" (FG4 workers)*
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Societal factors related to the eating habits of construction workers

A long day of physical work left workers with no time, motivation or energy to cook or shop for food, affecting their evening meal, next day food preparation, and generally eating behaviours outside of work (mentioned in four groups).

“If you look at most of the guys here, they're doing physical work, by the time they get home they're trying to deal with the family, cook and stuff like that. So by the time you've got to sort out your lunches for tomorrow, you're like, oh I'm going to leave it” (FG5 workers)

The cost of food, particularly foods perceived as healthy, was recognised as prohibitive in three FG, who reported that healthy food was more expensive, less convenient, with smaller portion sizes. The price of a salad was compared to a ‘meal deal’ by one worker, who highlighted he would need to spend £100 monthly to eat more healthily.

“... it's so expensive that you can't justify eating a sandwich that's like so tiny and it's probably the healthiest, but it will be like five quid” (FG5 workers)

Positive nutritional behaviours were reported to have happened over the last 10-15 years, including generational changes, with younger workers being more health conscious, practicing better nutrition habits and attending gyms (discussed in two FG). However, H&W practices amongst sites differed, with some companies running a variety of initiatives to “lead from the front” and “leave a legacy”, with other sites “being not interested”.

“Maybe a little bit of it will go along to the next projects and hopefully may change the world of construction” (FG1 workers)

Discussion

This is the first study exploring nutrition practices of UK construction workers and illustrating how individual (e.g. habits, knowledge, personal resources) and work-related factors, including environment and social connections, shape such practices. Identified factors, organised under the SEM model, were diverse and wide-ranging, demonstrating the complexity of the issue.

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5 The findings from this study are consistent and further expand on the limited body of evidence on
6 nutrition practices amongst construction workers. Workers reported high intakes of processed, high
7 calorie and high sugar foods as previously reported (MHF, 2009) as well as high intakes of caffeinated
8 drinks and low fruit and vegetable consumption, which are new findings of this study. In previous
9 research, workers described food as a release from work stress, a form of “escape” (Devine *et al.*,
10 2009), often leading to the consumption of energy-dense comfort foods (Nobrega *et al.*, 2016).
11 Although in this study, eating to sustain energy to fulfill physically demanding jobs was the primary
12 motivation behind this consumption pattern. A relationship between energy, nutrition and safety at
13 work has previously been established, suggesting that accidents might be at least partly attributed to
14 an unhealthy diet resulting in feeling weak, indisposition or hypoglycaemia (Bates & Schneider, 2008;
15 Meliá & Becerril, 2009). This indicates that, as suggested by a systematic review of Steyn *et al.* (2009),
16 a workplace intervention should target the needs of workers and therefore, provide education on the
17 relationship between diet, energy and concentration. It is worth noting that educational approaches,
18 alone or in combination with multi-component interventions or environmental modifications, have
19 previously shown moderate, but consistent effectiveness on dietary behaviour changes in systematic
20 reviews (Ni Mhurchu *et al.*, 2010; Maes *et al.*, 2012; Geaney *et al.*, 2013).
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33 Secondly, work-related factors, including job demands, break times and physical environments impact
34 the nutrition choices of blue collar workers (Loudoun & Townsend, 2017) by restricting access to food
35 outlets (Mazzola *et al.*, 2017; Nea *et al.*, 2017), provision of insufficient welfare, food preparation and
36 storage facilities (Nobrega *et al.*, 2016; Okoro *et al.*, 2017), limited time and personal resources to buy,
37 prepare or even plan food (Devine *et al.*, 2003; Thomas *et al.*, 2016). Given the vital role of the
38 workplace environment in assisting workers to adopt and lead healthier lifestyles, environmental
39 changes to facilitate healthy diets have been recognised as elements which can supplement education
40 components of interventions (Meng *et al.*, 2017). A systematic review by Allan *et al.* (2017) highlighted
41 that environmental changes can supplement and provide advantages over individually targeted
42 interventions, as they work via automatic or non-conscious processes. However, Schliemann &
43 Woodside (2019), in a systematic review of 21 systematic reviews, found that research on
44 environmental changes is often carried out in workplace canteens, therefore, evidence is limited to
45 interventions conducted in bigger organisations. In construction, sites often have limited space, and
46 the majority are temporary, operating only for weeks or months (Burki, 2018; Oswald & Turner, 2017),
47 which restricts the practicality and cost-effectiveness of implementing catering solutions. Although
48 some large sites offer canteens, workers usually stay in one place for a limited time and are not
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3 guaranteed to move to a location with similar facilities (Eaves *et al.*, 2016; Sherratt, 2018). Therefore,
4 workers, in the interest of their health, need to be offered interventions focusing on their capabilities
5 and motivation to make healthier food choices regardless of environmental constraints. Additionally,
6 simply providing more nutritious foods might be insufficient in facilitating behaviour change, as the
7 point of choice does not influence the food choice on its own but must be preceded by an intention
8 to change (e.g. behaviour change and educational activities) (Almeida *et al.*, 2014; Thomas *et al.*,
9 2016).

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16 Our study shows that amongst construction workforce, there is a growing interest in health (Eaves *et*
17 *al.*, 2016; Nea *et al.*, 2017) and in receiving feedback and advice from health professionals. Workers
18 were also found to be motivated to learn how to plan meals and establish healthy habits and routines,
19 which should encourage employers to invest in health initiatives on sites. However, to support the
20 engagement, improve the effectiveness, and ensure that interventions are not a lost opportunity,
21 those responsible for the intervention design need to consider the convenience of locations and
22 flexible modes of delivery (Brown *et al.*, 2018; Demou *et al.*, 2018), to enable the intervention to be
23 accessed by all workers (including sub-contractors, part-time workers). In addition, interventions
24 should be mindful of social connections, as food choices are often made to gain and solidify social
25 identity (Mazzola *et al.*, 2017), and individuals can be peer-pressured into healthy or unhealthy
26 behaviours (Okoro *et al.*, 2017). While multiple studies (Kilpatrick *et al.*, 2017; Payne *et al.*, 2018;
27 Smith *et al.*, 2017), including a systematic review of Demou *et al.* (2018), found the importance of
28 using peer support and group based activities in workplace health interventions. In construction, this
29 approach could provide support in integrating workers and managers working on site, and reduce,
30 ethnic and occupational groups divisions (found in this study), with the latter also previously reported
31 in the literature (Naweed *et al.*, 2017; Wandel & Roos, 2005). In addition, sharing experiences,
32 colleagues motivating each other, the introduction of champions, and a 'no judgment' approach
33 (especially in 'macho cultures') have been found to lead to a higher engagement and better
34 intervention results (Demou *et al.*, 2018; Kilpatrick *et al.*, 2017; Payne *et al.*, 2018). The 'no judgment'
35 approach is an interesting finding, in light of previously mentioned peer-pressure and the results of
36 this study. Our findings showed that some workers felt hassled and judged when using kitchen
37 facilities and pressured to consume sweet and unhealthy foods, highlighting the importance of
38 addressing the organisational culture to improve the health of workers.

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57 Finally, this is the first study that has explored nutrition practices amongst construction workers and
58 managers, enabling differences between the two groups to be identified. These included an interest
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3 in on-site health checks expressed by workers rather than managers. This may well be because
4 employment conditions for managers usually include employee assistance programmes, health
5 insurance, and occupational health services, while workers are frequently self-employed (41% of the
6 construction workforce (HSE 2018)), with limited access to occupational health services (Burki, 2018;
7 Stocks *et al.*, 2011). Occupational divisions were found to go beyond lunch eating practices and
8 included distinct wellbeing initiatives offered to different groups on site, with differences in the variety
9 and a state of facilities between the cabins of managers and workers, particularly on the large site (a
10 finding not been previously reported in the literature). Lastly, some of the comments made by
11 managers were related to the eating practices of workers, showing that they are aware of struggles,
12 barriers and poor eating practices amongst the workforce.
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21 Although this study is based on UK construction workers, it is internationally relevant, adding to the
22 small evidence base focusing on understanding nutrition practices amongst blue collar workers. This
23 is of particular importance given: the paucity of studies conducted amongst workers from this group,
24 highlighted in a recent systematic review (Van De Ven *et al.*, 2020); the research gap in respect of
25 effective interventions targeting low socioeconomic workforce (Robroek *et al.*, 2021); and the high ill-
26 health and injury costs associated with the industry. Our findings provide important insights into what
27 should be considered when designing effective nutrition interventions to improve the H&W,
28 particularly of construction workers in low socioeconomic positions.
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37 **Strengths and limitations**

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40 One strength of this study is that participants included both managers and workers from three
41 different construction sites and three different organisations. In addition, workers taking part in the
42 study were both employed by the main organisation running the construction sites as well
43 subcontractors, allowing the exploration of a range of views.
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48 Limitations of this study include risks associated with voluntary response bias, with participants who
49 volunteered to take part in the FG potentially having more interest in health and nutrition compared
50 with the other employee. Also, organisational constraints, rather than data saturation, determined
51 the number of focus groups, which is a limitation. Furthermore, although encouraged by the
52 moderator, not all participants contributed equally to all FG, potentially due to language barriers, or
53 feeling shy. A longer intervention time could have permitted the research team to conduct individual
54 interviews in addition to FG, or collect observational data on the actual nutrition practices in the
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3 workplace to supplement self-reported habits related by participants in the FG. This was not possible
4 due to the Covid-19 restrictions announced in March 2020, temporarily closing construction sites in
5 the UK.
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Supplementary material

Interview guide - Focus group questions

1. Can you tell me about your food choices and eating habits when you are at work?

(So what, when, where and how you eat at work? What do you usually eat for breakfast? Lunch? Does it work well? How about drinks? What influences what you drink and eat at work? (e.g. health concerns, other people, availability, time, breaks))

2. Can you tell me what kind of things make it easier for you to eat healthily when you are at work?

(Facilities / food places are available – kitchen, shops, cafes, canteen; breaks; knowledge about food; cost; availability)

3. Can you tell me what kind of things make it harder for you to eat healthily at work?

(Knowledge about food / nutrition; time constraints; practicalities – e.g. facilities like canteen / vending machines; local amenities; distance to amenities)

Supplementary material

Table 1: A summary of the search strategy

Search	Objective	Database searched	Terms searched	Inclusion criteria	Number of papers included
1	To explore existing evidence on the influence of work, work characteristics and working conditions (including environment) on eating behaviours, nutritional intakes, health and wellbeing of blue-collar workers	PubMed Web of Science Scopus Cochrane Library CINAHL ProQuest Science Direct	work or workplace or worksite and nutrition or diet and work characteristics or job characteristics or working conditions and blue-collar	<ul style="list-style-type: none"> - Studies published with the last 20 years - Studies published in English - Focused on the workplace; influences / effects of work, work characteristic and work conditions - Involve nutritional / dietary component - Involve blue collar workers 	<p>Initially identified n=345</p> <p>Retrieved after removing duplicated and initial title and abstract screening n=68</p> <p>Included in the review, following assessment against inclusion criteria n=26</p>

Supplementary material

Table 2: Factors influencing the nutritional choices of construction workers

SEM Factors	Themes	References	Key findings
Individual	Unhealthy behaviours	(Boschman et al., 2011; Considerate Construction Scheme, 2016; Oswald & Turner, 2017; Sherratt & Turner, 2018)	<ul style="list-style-type: none"> - Excessive alcohol consumption, drug use, smoking, gambling (affecting them at work) - Processed, high fat, high calorie food (take-away, ready meals)
	Nutrition knowledge	(Du Plessis et al., 2013; Men's Health Forum (MHF), 2009; Okoro et al., 2015; Viester et al., 2012)	<ul style="list-style-type: none"> - Little knowledge of the nutritional value of foods, high-fat foods consumed in the belief of supporting energy - Not aware of personal intakes
	Personal resources	(Devine et al., 2003; Mazzola et al., 2017; Naweed et al., 2017; Nea et al., 2017; Nobrega et al., 2016)	<ul style="list-style-type: none"> - Feeling under-pressure, undervalued due to the intensity of the workload - A lack energy, motivation and willpower to make healthier nutrition choices
	Demographic characteristics	(Cohen et al., 2013; Lingard and Turner, 2015; Queiroz Bortolozzo et al., 2016; Sassi et al., 2011; ONS, 2018)	<ul style="list-style-type: none"> - Low socioeconomic status and education levels (associated with higher abdominal obesity and BMI)
Interpersonal	Socialising at meals	(Devine et al., 2003; Loudoun & Townsend, 2017; Naweed et al., 2017)	<ul style="list-style-type: none"> - Socialising at mealtimes, sharing food and cooking ideas - Poor food choices impacting on relationships on site by making workers irritable, tired, and frustrated
	Social identity, peer pressure, peer-support	(Bonnell et al., 2017; Kelsey et al., 2000; Mazzola et al., 2017; Okoro et al., 2017; Wynd & Ryan-Wenger, 2004)	<ul style="list-style-type: none"> - Food choices to gain and solidify social identity - Peer-pressure into healthy or unhealthy eating (choices based on a majority decision) - Co-workers support with diet and lifestyle changes (those passionate about nutrition encourage others)
	Occupational group divisions	(Naweed et al., 2017; Wandel & Roos, 2005)	<ul style="list-style-type: none"> - The same occupational groups eating together - Lunch settings distinguishing workers according to their status (e.g. manual workers a shed, engineers at a table)
Organisational and community	Breaks – insufficient time to eat	(Nea et al., 2017; Nobrega et al., 2016; Thomas et al., 2016; Wandel & Roos, 2005)	<ul style="list-style-type: none"> - Short and infrequent breaks - Break time not protected (call back to work) - Breaks spent on checking in / out, waiting to get a meal / use a microwave
	Living conditions when working on site	(Burki, 2018; Oswald & Turner, 2017)	<ul style="list-style-type: none"> - Poor living condition, small, shared accommodation, no kitchen facilities

			- Relying on cheap take - away and pub meals
	Welfare facilities on site	(Nea et al., 2017; Nobrega et al., 2016; Okoro et al., 2017; Pridgeon & Whitehead, 2013)	- Poor site layout, inadequate, dirty facilities (toilets, canteen, changing rooms, no running water, towels, chairs, soap) - Poor (or a lack of) food preparation and storing facilities - Insufficient sitting spaces
	Site location affecting food choices	(French et al., 2007; Mazzola et al., 2017; Nea et al., 2017; Pridgeon & Whitehead, 2013; Smith et al., 2017; Wandel & Roos, 2005)	- Remote site locations - limited access to shops with fresh and diverse food - A lack of food offering on site – reliance on external food outlets with unhealthy food
	Job demands	(Devine et al., 2003; Leslie et al., 2013; Mazzola et al., 2017; Naweed et al., 2017; Nea et al., 2017; Nobrega et al., 2016; Punnett et al., 2013; Thomas et al., 2016)	- Work demands, inflexible schedules, overtime - no time to prepare meals, do shopping - Overeating, comfort eating, food as a form of “escape” - Under eating and low appetite due to stress
	On site canteen (positive and negative effect)	(Almeida et al., 2014; Bonnell et al., 2017; Escoto et al., 2010; Mazzola et al., 2017; Nea et al., 2017; Price et al., 2016; Queiroz Bortolozo et al., 2016; Smith et al., 2017)	Positive: - healthier food choices (more fibre, fruit and vegetables) - lower consumption from vending machines and external outlets, like take-aways Negative: - No choice - unhealthy and fried options served in canteen (acceptance due to the convenience and time saving) - Unlimited food in canteens – overeating (temptation, boredom)
	Safety, accidents and food choices	(Camino López et al., 2011; Chaplin and Smith, 2011; de Medeiros et al., 2014; Loudoun and Townsend, 2017; Meliá and Becerril, 2009; ODA, 2012)	- Unsafe behaviours attributed to unhealthy eating (recognised but underestimated) - Relationship between work injury risk and nutrition (unhealthy behaviours impacting alertness, performance)
	Shift work	(Hemiö et al., 2015; Lowden et al., 2010; Naweed et al., 2017; Nea et al., 2017; Souza et al., 2019)	- No food facilities at night - Irregular eating patterns

Societal	Cost of healthy foods	(Pridgeon & Whitehead, 2013; Steenhuis et al., 2004; Thomas et al., 2016)	<ul style="list-style-type: none">- Cost impacting food choices- Healthier food considered expensive- Healthier food vs. financial objectives of canteens – conflict
	A growing interest in health and changes in the industry	(Eaves et al., 2016; Nea et al., 2017)	<ul style="list-style-type: none">- Growing interest in health- Workplace changes to improve health and wellbeing welcomed- Younger workers more health conscious
	Masculinity	(Naweed et al., 2017; Wandel & Roos, 2005)	<ul style="list-style-type: none">- Unhealthy behaviours to demonstrate masculinity (in male dominated industries)

For Peer Review

Supplementary material

Table 3: Participants and sites characteristics

Site	1	2	3
Number of FG+ participants (n)	1 Workers; n=9	3 Managers (2FG); n=11 Workers; n=8	1 Workers; n=10
Size	Small - 12-14	Large - 300	Medium - 50-100
Status	Permanent	Temporary	Temporary
Workforce characteristics	85% - live locally 15% - transient *	30% - live locally 70% - transient	60% - live locally 40% - transient
Facilities	Kitchen with blenders, grills, microwaves, kettles and fridges; sitting area	Kitchen with microwaves, kettles, fridges, blenders, grill; sitting area (only in 2 main cabins)	Kitchen with microwaves, kettles, fridges and storage area; sitting area
Local food outlets	Walking distance – a supermarket, other site canteen	A fast-food van available on site Drive (15min) –coffee shops, a petrol station, fast-food restaurants	Drive (15min) – a sandwich shop, fast-food restaurants, a coffee shop, supermarkets

*Transient workforce – workers who work away from their normal place of work or have no fixed work base (HSE, 2021)

Supplementary material

Table 4: Socio-Ecological Model (SEM) of nutrition practices amongst UK construction workers (summary of focus group themes)

SEM factor	Sub-theme previously found in the literature	Sub-theme previously found in the literature AND identified in focus groups in this study	NEW sub-theme identified in focus groups in this study, not previously found in the literature
Individual	<ol style="list-style-type: none"> 1. Obesity and other health problems 2. Unhealthy behaviours including excessive alcohol consumption 3. Energy – importance of sustaining energy during the working day 4. Nutrition knowledge 5. Convenience foods 6. Skipping meals 7. Snacking 8. Soft drinks and energy drinks consumption 9. Water intake 10. Personal resources 11. Taste and appetite 	<ol style="list-style-type: none"> 1. Obesity and other health problems 2. Unhealthy behaviours including excessive alcohol consumption 3. Energy – importance of sustaining energy during the working day 4. Nutrition knowledge 5. Convenience foods 6. Skipping meals 7. Snacking 8. Soft drinks and energy drinks consumption 9. Water intake 10. Personal resources 	<ol style="list-style-type: none"> 1. Tea and coffee consumption 2. Fruit and vegetable intake 3. Bringing food from home 4. Meal planning and preparation 5. Habits and routines
Interpersonal	<ol style="list-style-type: none"> 12. Socialising at meals 13. Social identity, peer pressure, peer-support 14. Occupational groups divisions (eating practices) 	<ol style="list-style-type: none"> 11. Socialising at meals 12. Social identity, peer pressure, peer-support 13. Occupational groups divisions (eating practices) 	<ol style="list-style-type: none"> 6. Occupational groups divisions (facilities and health promotion opportunities)
Organisational and Community	<ol style="list-style-type: none"> 15. Breaks – insufficient time to eat 16. Living conditions when working on site 17. Welfare facilities on site 18. Site location affecting food choices 19. Job demands 20. On-site canteens (positive and negative effects) 21. Shift work 22. Safety, accidents and food choices 	<ol style="list-style-type: none"> 14. Breaks – insufficient time to eat 15. Living conditions when working on site 16. Welfare facilities on site 17. Site location affecting food choices 18. Job demands 	<ol style="list-style-type: none"> 7. Feedback and advice from professionals 8. Food preparation at work
Societal	<ol style="list-style-type: none"> 23. Eating behaviour outside work 24. Cost of healthy foods 25. A growing interest in health and changes in the industry 	<ol style="list-style-type: none"> 19. Eating behaviour outside work 20. Cost of healthy foods 21. A growing interest in health and changes in the industry 	