'Eating to survive': A qualitative analysis of factors influencing food choice and eating behaviour in a food-insecure population

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Running Title: Food insecurity, food choice and eating behaviour

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Conflict of Interest: Charlotte A. Hardman and Jason C.G. Halford receive research funding from the American Beverage Association for work outside of the submitted manuscript.

Funding: The research reported in this manuscript was funded by a local pump-priming grant from N8 AgriFood awarded to Charlotte A. Hardman.

Abstract

Food insecurity affects approximately 8.4 million people in the UK, one of the worst levels in Europe. Food insecurity is associated with poor diet quality and obesity; however, the drivers of this relationship are unclear. This study used a qualitative approach to explore factors that influence food choice and eating behaviour in a food-insecure population in Liverpool, UK. Face-to-face interviews were conducted with adults (*N*=24) who were clients at foodbanks. The interviews were informed by a semi-structured interview schedule, which focussed on access to food, factors influencing food choices, and strategies used to conserve food. Interview transcripts were analysed using inductive thematic analysis. Six themes were identified; 'Income', 'Cost of food', 'Accessibility of shops', 'Health issues', 'Food rationing strategies' and 'Worsened health outcomes'. Income was the most salient factor influencing participants' food choices with all participants reporting a constant struggle to afford food. Food decisions were primarily based on cost; most participants valued eating healthily but could not afford to do so. Strategies to ration food included skipping meals, consuming small portions, cooking in bulk, and prioritising children's food intake. The majority of participants reported pre-existing physical and/or mental health issues, but these were exacerbated by poor access to food leading to a vicious cycle of stress and worsening health issues. In conclusion, participants' food choices and eating behaviour seemed to be most strongly influenced by their level of income. Findings also highlight the mental health impact of food insecurity. Initiatives addressing income and the cost of healthy food are required.

Keywords (up to 6): Food insecurity, income, diet, food choice, mental health

Introduction

Food insecurity is defined as having limited availability or ability to acquire sufficient food in socially acceptable ways [1]. It is a growing problem in the UK, currently estimated to affect 8.4 million people [1]. Previous research has found that food insecurity is robustly associated with poorer diet quality [2-5], higher levels of obesity (most notably among women in high-income countries) [6], and poor mental health including increased incidence of depression and common mental disorder [7, 8].

The increasing cost of food is a likely key contributor to food insecurity, with healthier meals (as defined by nutrient profiling) being significantly more expensive compared to less healthy meals [9, 10]. A recent report found that, for 53% of households in the UK, current food budgets are insufficient to meet government recommendations for a healthy diet [11]. The wider food environment also plays a key role. "Food deserts" are defined as areas which are poorly served by food outlets selling fresh, healthy products and are particularly prevalent in more deprived communities [12, 13]. Individual differences and psychological factors in the context of food insecurity are also important but are under-studied.

In response to food insecurity, foodbanks provide emergency food packages to individuals in most need, usually consisting of non-perishable food items donated by the public which often do constitute a nutritious balanced diet [14]. Given the rising cost of food, it is unsurprising that foodbank usage has increased. According to the Trussell Trust (a Non-Government Organisation and charity that co-ordinates the only nationwide network of foodbanks in the UK), more than 1.3 million three-day emergency food packages were distributed across the UK in 2017 and 2018, a 13% increase on the previous year, with 197,182 packages distributed in the North West of England alone [14]. Government-backed schemes, such as free school breakfasts, can alleviate some of the pressure for families on lower incomes [15]; however, they are typically only available during school term time. There is a stigma around the use of foodbanks and they are often only used as a last resort [16, 17].

Much of the existing research on food insecurity has been conducted in North America and findings may not be generalizable to other countries due to differences in welfare systems, sources of income and strategies in place to reduce food insecurity [18, 19]. However, recent findings from the UK indicate that the highest levels of foodbank use have occurred in areas with the highest rates of central Government welfare cuts, unemployment and benefit sanctions (i.e. penalties imposed on claimants meaning a loss or reduction of benefits when someone does not meet conditions such as attending jobcentre appointments) [20]. In support of this, food back usage is particularly prevalent among individuals who are in receipt of welfare benefits [21], as well as among individuals who have mental health problems [22]. Furthermore, findings from the UK-based Born in Bradford cohort indicate that individuals who were food insecure were more likely to have a poorer quality diet (i.e. lower vegetables consumption and higher intake of sugar-sweetened beverages) compared to individuals who were not food insecure [23].

Qualitative research can provide detailed insight into factors that explain the relationship between food insecurity and diet. Qualitative studies in UK populations are beginning to emerge, however the existing evidence base is specific to certain cities and regions. A recent study conducted with foodbank clients in London found that consumption of healthy food is not feasible due to a lack of access to fresh food, food storage and cooking facilities [24]. Participants who experience food insecurity also report restrictive eating patterns, for example eating smaller meals, skipping meals and not eating for an entire day [16, 25]. Food insecurity also exacerbated existing health issues, such as stress, depression and weight gain, and had a negative impact on the health and wellbeing of dependent children [17, 24, 25]. Interestingly, qualitative research from the UK and United States (US) indicates that food-insecure populations do not lack knowledge of nutrition and how to prepare healthy meals [4, 17]. Instead, barriers to healthy eating seemed to relate to cost, inadequate geographical access, and poor quality of available healthful food. Stress and low mood associated with food insecurity and socio-economic disadvantage could also lead to maladaptive coping strategies and thereby promote unhealthy food intake. For example, a recent quantitative study from the UK found

that stress and emotional eating explained the association between lower socio-economic status and higher body mass index (BMI) [26].

Food insecurity is a major public health concern emphasising the need for tailored interventions and preventive approaches to facilitate healthy dietary behaviours. However, the development of effective interventions is hindered by a lack of understanding of the psychological drivers of dietary behaviour in food-insecure communities. The aim of the current qualitative study is therefore to understand the key factors influencing food choice and eating behaviour in food-insecure populations in Liverpool in the North West of England, one of the most deprived cities in England [27]. Recent research conducted in Liverpool indicates that children living in more deprived communities had higher levels of obesity than children from less deprived communities, and this socio-economic disparity widened between 2006 and 2012 [28].

Material and methods

Participants

In accordance with the COnsolidated criteria for REporting Qualitative research (Core-Q) checklist [29] (see Supplementary Material), participants were adults recruited using purposive sampling from a foodbank and an income-support charity in Liverpool, UK. Recruitment continued until data saturation was reached. Participants received a £20 voucher for a national supermarket chain as reimbursement for taking part in the study. Descriptive information about participants is provided in Table 1.

Procedure

Participants were invited to take part in a face-to-face interview with a doctoral-qualified male or female researcher (GSK or CAH). Prior to the interview, participants were provided with a participant information sheet which outlined the aims of the research and informed them that the researchers were from the University of Liverpool. Participants were also informed that their responses would be

audio recorded using a digital dictaphone and that their data would be anonymised and stored securely. No relationship was established between the researchers and participants prior to interview.

A semi-structured interview guide, developed by CAH and AF (see Supplementary Materials), was used to inform interviews. Topics included methods used to access food, strategies used to conserve food supplies, impact of access to food on other aspects of their life and feelings around participants' current access to food.

Interviews were conducted between February and April 2018 on a one-to-one basis (two participants had children aged 2 years or under with them during the interview, this was unavoidable due to the sampling method) at the food bank or charity premises. No repeat interviews were conducted. Due to the sampling method, it was not possible to return transcripts to participants for comment. Ethical approval for the study was provided by the Institute of Psychology, Health and Society Research Ethics Committee, University of Liverpool (reference number 2964).

Analysis

Interviews were audio recorded, transcribed verbatim and anonymised. Field notes were not made during the interview. Inductive thematic analysis was used because this method allows for themes and codes to be strongly linked to the data [30]. This method involves a five-phase approach; familiarisation with the data, generating initial codes, searching for themes, reviewing themes, and defining and naming themes [30].

NVivo 10 was used to facilitate the coding process and analysis continued in an iterative process whereby raw data was continually analysed to identify themes that could be merged, separated or removed if redundant. A sample of extracts were randomly selected and sent to a second coder (DLR), along with a developed codebook to establish procedural reliability conceptual credibility [31]. The first author (JP) reviewed coded extracts to establish coding consistency and any disagreements were resolved in a meeting. An excellent agreement rate was established ($\kappa = .95$).

Results

Twenty-seven individuals were approached to take part and of these, 24 (89%) provided consent to be interviewed (it is not known why three individuals declined to take part).

Nine participants were female and 15 were male. Nineteen participants reported living alone and five lived with other people. Four participants (all female) had dependent children. Two participants reported working part-time (see Table 1). All participants were in receipt of benefits, such as Universal Credit. This is a social security payment provided to those on a low income or out of work to help with living costs, introduced in the UK to replace individual benefit systems, such as Child Tax Credit, Housing and income-related Employment and Support Allowance [32].

Table 1: Characteristics of participants interviewed.

		Number (%) of participants
Gender	Male	15 (63)
	Female	9 (37)
Living situation	Alone	19 (79)
	With dependent children	4 (17)
	With others (not dependent children)	1 (4)
In receipt of benefits		24 (100)
Works part-time		2 (8)

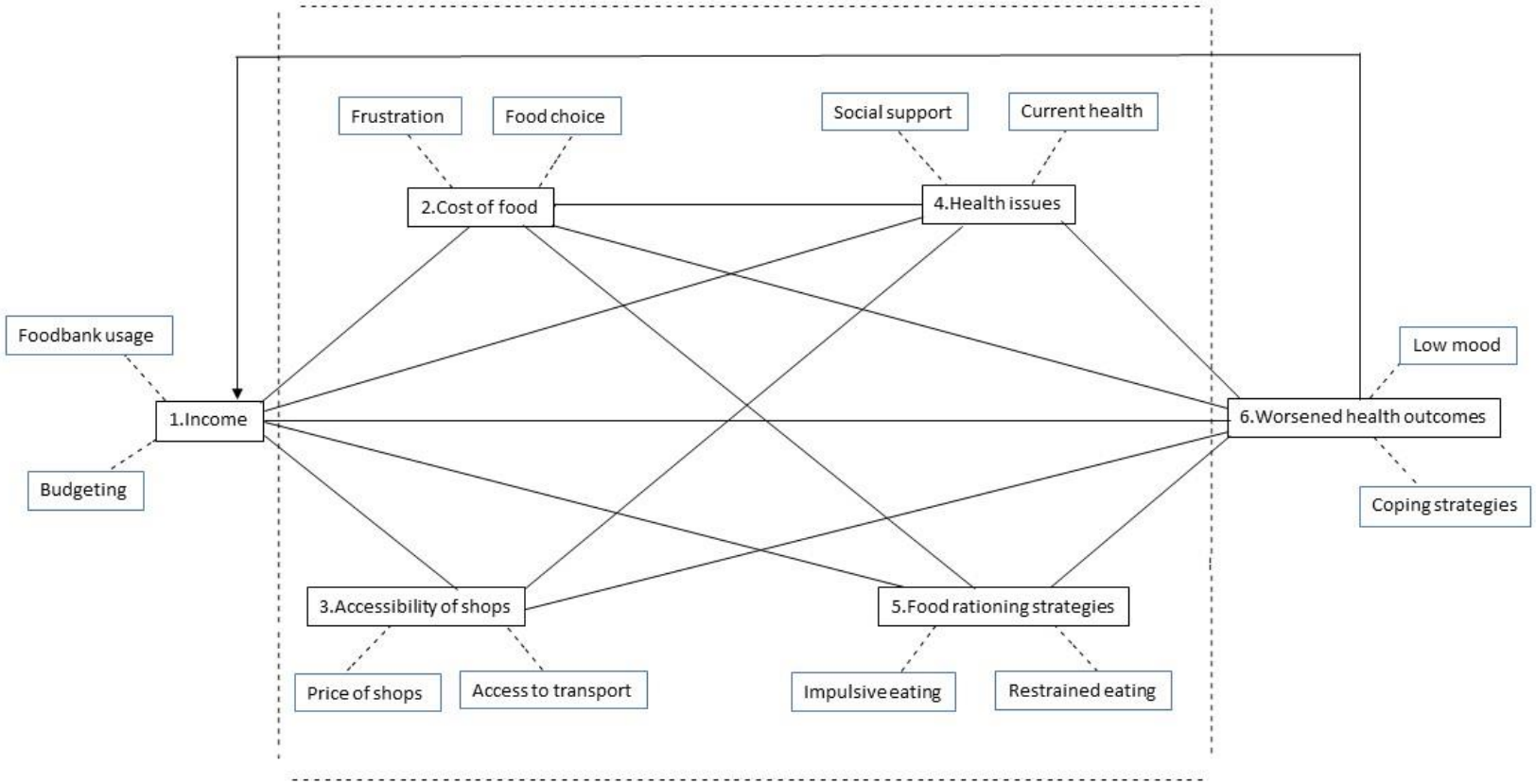

Figure 1: Thematic map of themes (black outlined boxes) and sub-themes (blue outlined boxes). Solid lines represent links between themes and dashed lines represent links between themes and sub-themes

Overall themes (Figure 1)

Our thematic analysis revealed six themes which influenced food choice and eating behaviour in this food-insecure population in the North West of England: (1) Income, (2) Cost of food, (3) Accessibility of shops, (4) Food rationing, (5) Health issues, and (6) Worsened health outcomes (see thematic map in Figure 1).

Income was found to be the key theme as participants' food choices and eating behaviour were dependent on this. Income directly influenced the amount participants could spend on food (i.e. cost theme), where they obtained food (accessibility theme), their need to engage in food rationing strategies, and their ability to manage current health issues. To illustrate this, these four themes (i.e. cost, accessibility, food rationing strategies, and current health issues) are grouped together in the thematic map, as denoted by the dashed square. All themes were, in turn, associated with the worsened health outcomes theme. The arrow from the worsened health outcomes theme back to the income theme indicates that participants' worsening health made it harder to manage their limited income. This process seemed to recur as they consistently received a low income which made it difficult to break the cycle, hence the illustration of links between themes and cyclic nature in the thematic map (see Figure 1).

Theme one: Income

Participants' food choice and eating behaviour seemed to be most strongly influenced by their level of income as participants could only obtain food that was within their financial means. Most participants discussed the challenges they experienced with managing a limited budget and affording food to provide for themselves and those they lived with. There appeared to be a constant struggle of purchasing and obtaining food throughout the month and then resorting to using foodbanks when other alternatives had been exhausted which raised feelings of shame and embarrassment. Participants also discussed the lack of food choice when using foodbanks. This theme consists of two sub-themes; 'budgeting' and 'foodbank usage'.

Budgeting. Participants reported experiencing constant struggles of managing a low budget whereby they prioritised housing costs and bills before food. Once outgoings were paid, participants reported managing an extremely limited budget for food which needed to last until the next benefit payment.

"…by the time they take off what they have to take off I only end up with £79 a fortnight. And then I have to pay bills out of that as well. It's like I got paid yesterday and I had £15 left so I have no money to get shopping…" (Participant 14)

Participants reported experiencing frequent delays in receiving payment, particularly if in receipt of Universal Credit, due to recent changes in the welfare system. These delays reduced their ability to afford food, which led most participants to ration their food supplies. Several participants found themselves in increasing debt as a result of borrowing from friends or family members whilst waiting for their payment, which seemingly led to further difficulties affording food.

"…you're in over your head with debt anyway because you've lent off this person, you've lent off that person. And by the time your money comes through it's a spiral then of you owe out money and then it's just- the way- the weeks they make you wait for your money to go through is, I don't understand why it takes six or seven weeks to pay your money." (Participant 2)

Due to continuous struggles with managing their budget, several participants reported being angry towards the welfare system and the Government as they believed they had been marginalised from society and left to struggle to live without reasonable support.

"…There's no people helping any more. Apart from the Social, there's no one helping apart from the foodbanks and that's where it's getting worrying because, if the foodbanks go, then there's no food to feed people is there?" (Participant 12)

Accessing food from foodbanks. Participants seemed to resort to using foodbanks towards the end of the month or shortly before the next payment was due because they had run out of money. There

seemed to be a reluctance to use foodbanks; most participants reported feeling embarrassed and ashamed of resorting to foodbanks and the process involved in gaining access to them.

"There's a lot of stigma around. But I think a lot of the discomfort and stigma, a lot of it is self-imposed, I think. It's not that anyone's going 'haha look at him he's using a foodbank'. It's just that I feel ashamed that I'm in that situation because I feel like I'm going in with my bowl asking for scraps of bread and things. That's kind of what it feels like. It's a very shameful experience." (Participant 22)

Most participants viewed foodbanks as a necessity. They seemed grateful for these services and were not sure how they would survive without them. However, participants also reported that foodbanks were restrictive as they only provided food to last three days and did not address other issues related to being on a low income.

"I've used foodbanks in the past, but I find the stuff you get out of foodbanks is basic. Three days rations and stuff I don't really like to eat anyway. Broccoli and vegetables and stuff like that and pasta and stuff like that." (Participant 17)

Others noted the restrictions in place by the welfare system through the introduction of sanctions which are interpreted as assuming that food-insecure individuals are only in crisis for a specified number of times per year. However, this was not consistent with the participants' personal experiences and seemed to enhance the anger felt by participants.

"…it's (foodbanks) for people in need but then the guidelines are there 'well you're only allowed to be in a need beyond your control three times a year'." (Participant 3)

Theme two: Cost of food

Most participants reported that the cost of food was another salient factor when considering their food choice and eating behaviour as they could only afford to purchase food that was within their budget. Participants valued eating healthy food, including fruit and vegetables, but could not afford

to do so. The majority appeared to understand how to prepare and cook a healthy meal but could not justify doing so on their limited budget.

"…because I did cookery classes and all those little bits. And if you go home and you've got the basic ingredients and it needs a bit of basil and it needs a bit of soy sauce and it needs a bit of that. By the time you buy all those little bits- I mean me little meal I'm gonna cook will be about £30…." (Participant 17)

This theme consists of two sub-themes; 'food choice' and 'frustration'.

Food choice. Most participants believed their food decisions were not a choice but a means to survive. Although participants valued eating healthily, they seemed to do an analysis of food items based on price, longevity, and how filling the food would be. Participants reported that they often did not enjoy food purchased and instead consumed food that was cost-effective.

"It is stressful, very stressful. Because I don't think I'm eating in a healthy way. I'm eating to survive, it's not healthy at all." (Participant 9)

Some participants reported purchasing healthier food shortly after receiving payment, when they were able to afford to do so, but then changing to purchasing less healthy foods towards the end of the month or shortly before they were due their next payment as this was more affordable.

"I've eaten the right kinds of food for a couple of days and then for the rest of the week I'm limited as to what I can eat, or I'm eating food unseasoned. It's mainly- I look at a lot of processed foods…" (Participant 3)

Another factor which seemed to influence participants' food choices was whether they had dependent children. For participants with dependent children, it seemed they were unable to afford wasting food, therefore they purchased food based on their children's preferences and consumed leftover meals themselves.

"I'll choose something that I know they're gonna like because I can't afford to do something and for them not to eat it. I just can't afford it, yeah." (Participant 2)

Frustration. A recurring issue was the inability to afford food that participants enjoy, such as a dessert or a roast dinner, and this seemed to increase feelings of frustration. There was a constant compromise being made between eating daily and ensuring that food would last throughout the week. The presence of food advertisements on television also seemed to contribute towards levels of frustration where participants reported being presented with images of aesthetically pleasing meals yet being unable to afford to purchase these.

"Frustrating…I'm always short, I'm always sacrificing one thing so it's not very often that I'm quite content with the way things are." (Participant 3)

When participants could afford to buy food, they were limited due to its cost and this resulted in having minimal choice of food and seemed to contribute towards further feelings of frustration.

Theme three: Accessibility to shops

Another important factor influencing participants' food choice and eating behaviour was the accessibility to shops. Whilst this factor was salient, it seemed that participants' access to shops was area dependent whereby the majority were within a short distance to food shops, however some were not. The majority of participants walked to food shops due to their limited budget; however, this was reliant on being in good health to walk and carry bags of shopping home. This theme consists of two sub-themes; 'access to transport' and 'price of shops'.

Access to transport. None of the participants had access to personal transport, such as a car, and relied on using public transport which was an additional expense they often could not afford. Most participants accessed food by means of walking to save money, however, this relied on them being physically and mentally able. Many participants reported experiencing various health issues and this was worsened when food shopping.

"…I do a lot of walking. I won't get busses and all that. To get here I'll walk here. I live about 20 minutes away. So I'd rather walk than get the bus. Cos it's expensive just to get a bus. I mean a Daysaver is nearly a fiver. I'd rather walk than spend a fiver. That's my tea money." (Participant 17)

One participant lived in an area of Liverpool which had limited access to food shops, therefore, this participant used public transport when other tasks could be done in the city centre which made travel more cost-effective.

"So, if you've got no transport in [location], you basically are pretty much reliant on buses, so that's more cost. Particularly for shopping, and if you've got your laundry to do, you try and do it on the same day, so you just get one £4.30 travel for the day and try and get everything in in the same day." (Participant 10)

Price of shops. Participants favoured purchasing food from budget supermarkets which were close to their home, instead of local shops, as these were more cost-effective, had variety and sold items in smaller batches.

"I go to the Aldi because it's cheap, it is the cheapest around and it's quite near." (Participant 2)

Most participants avoided using local shops unless necessary as they could not justify the cost of food items. A couple of participants obtained food from cafés and takeaways, however, they tended to be in the minority.

"if I have to go local, I will go local and it's just really expensive." (Participant 8)

The preference to access food by means of cheap supermarkets, as a way of saving money, relied on being in good health. This resulted in some participants reporting pain or other health issues due to the strain of carrying food home.

"I have to try and get a food voucher to go to a food bank and, even carrying them home, the food, if I can get a food voucher, carrying them home with my bad back, it's horrendous" (Participant 9)

Theme four: Health issues

Most participants reported experiencing either mental or physical health issues, such as depression or diabetes, which impacted their ability to i) go food shopping, ii) decide on food items purchased, and iii) prepare and cook food. This theme consists of two sub-themes; 'current health condition' and 'social support'.

Current health condition. 13 (54%) and 17 (71%) of participants reported having a mental or physical health condition, respectively, of whom some were on medication which influenced their eating behaviour. Those with conditions, such as diabetes, understood needing to eat healthily to alleviate symptoms of their condition but could not afford to do so.

"I'm diabetic and I know I've got to eat four times a day, so I'll eat Weetabix. Because it's easy to swallow. And I don't mind the taste with a bit of sugar…" (Participant 20)

Other participants discussed the impact of their health condition on the ability to make a meal. For example, it was noted that cooking a batch of food to last several days requires effort and planning, which was not always feasible for those who reported having low mood or depression.

"But then living on my own and going through my mental health issues…half the battle is having the energy or motivation to cook something from fresh so I've tended to – not so much steer away from fresh food but if I did buy fresh food, just be wary that I'm not always in the best of moods or frame of mind to cook a fresh meal and that there would be waste." (Participant 3)

Social support. Some participants had a network of friends and family who supported them in terms of providing food when resources were low or when participants were struggling to cope. This seemed to alleviate some of the effects of being food-insecure and the stress participants experienced, for example one participant reported having family members who help:

"I've got my son who lives with me and my granddaughter. I've got daughters that come up and they do a lot for me. They keep my mind busy because they bring the kids up" (Participant 14)

This sub-theme seemed to be a protective factor regarding pre-existing health issues, as those who had others who could support them appeared to benefit from this compared to those who did not have such networks.

"if I haven't got the money, normally my Dad's got a secret pot if he's got money in it, he'll give me it. But if he hasn't got it then me Dad's worrying over me because I haven't got stuff in for the kids. Then he'll take them for me to try to find other ways for me to get money or funds to supply them with the food for that." (Participant 6)

"I have no family, no friends. I was in a new area and a new flat and I had nothing. No one to turn to or that so I was kind of left a week on that. It was only my mental health worker at the time who come round and was like 'no it isn't good enough' and she got me my money and that was a week later. But I'd gone the whole week without food…" (Participant 25)

This theme highlights the wide-ranging impact of health issues and demonstrates that food choice and eating behaviour are influenced by health issues as these can limit access and means of obtaining the appropriate food. It also highlights how social support can act as a protective factor to this.

Theme five: Food rationing strategies

In a similar way to how participants described rationing money (see 'budgeting' sub-theme of the 'income' theme), a majority seemed to ration food to make it last longer. However, this theme is distinct as it relates to the strategies participants used to make their food last longer, such as skipping meals and restricting portion size. Participants reported differing cooking skill levels, however, several reported cooking in bulk and freezing batches as this was more sustainable given their limited budget. There were two participants who presented a different food strategy; impulsive eating. This theme consists of two sub-themes; 'restrained eating' and 'impulsive eating'.

Restrained eating. Most participants cooked meals in bulk and froze them as this guaranteed having a meal on most days and made money last longer.

"Freeze it. Sometimes I make spaghetti Bolognese. I get me mince out of Aldi and me spaghetti out of there which is dead cheap and the Dolmio. I get that, and I'll make a big massive pan of that and I'll get about six meals out of that." (Participant 15)

Despite using such strategies, several participants reported rarely having three meals per day and instead skipped meals due to lack of food supply to provide meals throughout the day. This seemed to happen more frequently just before a payment was due.

"Yeah [skipping meals], usually it is, yeah. The first week is usually alright, when I get me money, the second week is always the one where I'm thinking 'what should I do here, how can I cope with this week?'…" (Participant 12)

Participants with children prioritised their child's food consumption over their own and reported having a smaller portion or skipping meals altogether so their children could eat.

"And if the food's very low, I tend to go without food so that the kids can eat" (Participant 2)

Impulsive eating. Two participants reported buying and consuming food impulsively; they described eating food stored at home even though they understood this would lead to having minimal food to last for the rest of the week.

"I mean I'm one of them, as well, I'll eat a meal knowing it's my last, knowing that I'd be, by eating those pieces of toast in the night or whatever, would stop me, for example, or using that last bit of milk would stop me having toast and cereal and a cup of coffee with milk in. Then, knowing the consequences I'd sort of act for the moment and then sort of think to myself I'll worry about it later." (Participant 3)

This sub-theme suggests that individuals who face similar restrictions to accessing food, behave in different ways with some employing coping strategies which disregard the longer-term consequences. This may reflect frustration and a desire to experience pleasure from food.

Theme six: Worsened health outcomes

Most participants reported experiencing worsened mental or physical health due to their lack of access to food, food choices and eating behaviour. Feelings of depression, stress and hopelessness were salient throughout the interviews, however, participants seemed to minimise these emotions. It seemed that worsened health due to inconsistent access to food is a recurring cycle that is difficult to manage as there were no changes in participants' incomes, as highlighted in Figure 1. This theme consists of two sub-themes; low mood and coping strategies.

Low mood. The majority of participants reported currently having a mental health condition including low mood and ruminating thoughts which several participants believed was due to the uncertainty of affording food.

"Yes, I was very stressed and then panicking that- panic, like panic attacks, things like that. Because I'm thinking too much. I'm thinking 'what are my kids going to eat tomorrow and after tomorrow?'. I was thinking 'well, I don't know what I have to do." (Participant 7)

Some participants tried to remain optimistic about improving their access to food and perceived others were worse off than them, however they seemed to continue to experience heightened levels of stress as they did not know where their next meal would come from. The coping strategies participants adopted seemed to influence the level of stress and low mood they experienced.

Coping strategies. Most participants reported adopting a variety of coping strategies, such as walks, meditation and staying out of the house. These strategies tended to focus on preoccupying the mind, managing stress and suppressing hunger. Some participants did not adopt these techniques and instead seemed to preserve their energy and minimise activity.

"But nine times out of ten if I've got stress I am noted for going on huge walks. I don't stay in. I'm not one to get depressed in a property, I always try to get out and spend as much time as I can out." (Participant 10)

"Interviewer: Are there strategies that you use?

Participant 15: I just shut up shop. I just shut me blinds and just everywhere's shut and go through the motions." (Participant 15)

A small minority of participants reported using alcohol and other illicit substances to suppress hunger and to cope with the stress of their access to food.

"…alcohol wise, I'd just go and lend off someone, do you know what I mean, just to get that bottle just to get me through the day." (Participant 15)

"Cos I'm on low income you know…struggling all the time mate. It not good for my health either you know what I mean? I'm depressed as it is and it makes me even worse. And you drink more then, don't you, do you know what I mean?" (Participant 5)

This theme demonstrates the impact of having a poor quality diet with restrictive food patterning on health and wellbeing, and the difficulty of improving this situation due to a continuous low income.

Discussion

Food insecurity is increasingly a major issue in many developed countries and has significant adverse effects on a range of outcomes related to diet, health and wellbeing. The aim of this study was to understand the factors which influence food choice and eating behaviour in a food-insecure population from the North West of England. Our main findings were that income was that the most salient factor influencing food choice and eating behaviour. The cost of food, accessibility to shops and health issues were other contributing factors towards food choices and eating behaviour, with participants adopting strategies to ration food to ensure longevity; however, all these issues seemed to be exacerbated by low income. Participants also experienced worsened health outcomes as a result of their poor access to food and diet quality, and this seemed to lead into a recurring cycle that was difficult to overcome.

All participants were in receipt of benefits and emphasised the constant struggle of managing a low income and the compromises that had to be made, which were worsened by significant delays in welfare payments. This reflects the recent changes in the welfare system in the UK and the introduction of Universal Credit where many people experienced significant changes and delays in payment [33]. As a result of these changes, participants in this study reported struggling to obtain food supplies and relying on food banks until they received their next payment. This is consistent with previous research which found that income and delays in payment are the main reasons for attending foodbanks [20, 21, 24]. Our findings also highlight how the issue of income seemed to contribute towards anger directed at the welfare system and this may have implications for how future government-driven interventions on food insecurity are received. Issues relating to income and delays in benefit payments could be tackled in future research through the use of public involvement, which has become more utilised in health and social care research and can have positive impacts [34]. Policy makers and governments could consider involving service users in decision-making to provide an insight into the potential impact and reception of proposed changes.

Our analysis indicates that most participants valued eating healthily and had a good understanding of how to prepare and cook healthy meals yet could not afford to do so. This is in line with previous research [4, 17] and also evidence showing the disproportionate costs of healthy and unhealthy meals [9]. Instead, food choice and eating behaviour seemed driven by the need to survive; participants chose food based on price, longevity, and how "filling" the food would be. They could not justify spending money on food that was perishable and may go to waste. Overall, this resulted in consuming a poor quality diet. Participants' decisions to choose cheap, filling foods have been similarly shown in previous research [17, 23, 25]. Taken together, this suggests that educational interventions aimed at increasing knowledge of healthful eating in food-insecure populations may not be most useful for improving food choice and eating behaviour. Instead, making healthy food more affordable would be a more effective strategy, particularly as participants frequently referred to their low income as reasons for not being able to afford such food.

Our study also provides insight into the strategies that participants engaged in to conserve food. Cooking in bulk and freezing meals were frequently reported. However, participants also reported consuming smaller portions and skipping meals altogether when their income was running low. For those living with dependent children, participants reported that they would prioritize their child(ren)'s food intake over their own. This finding is consistent with other UK-based qualitative studies which have shown evidence of food "sacrificing" by parents and also grandparents [16, 24]. This growing research evidence highlights the deleterious impact of food insecurity on the health and wellbeing of children and families. Notably, 17 and 13 participants had either a physical or mental health condition, respectively, which necessitated the consumption of certain foods at particular times of the day, however this was challenging due to budgetary constraints. Previous research has also highlighted that individuals who experience food insecurity struggle to maintain specialised diets for medical conditions such as irritable bowel syndrome and other food intolerances [23, 24].

While several participants had chronic physical and/or mental health conditions, our study also informs on the implications of food insecurity for health - the majority of participants experienced worsened health issues, particularly increased stress and anxiety, due in part to their limited income and poor-quality diet. This appeared to have negative effects on all the other themes identified in our study, and individuals thus appeared to be caught in a vicious circle. This finding is consistent with previous research which has found that that physical and mental health conditions are worsened by the experience of food insecurity [17, 24]. Our study specifically highlights how low mood and lack of energy (i.e. common symptoms of mental health conditions) can exacerbate the difficulty of effectively managing a limited food budget, for example, by making it difficult to plan and cook food from fresh. Additionally, it is known that being chronically stressed increases appetite, specifically for high-calorie foods, and can thus be a risk factor for obesity and weight-related health outcomes [35]. Experiencing chronic emotional distress, linked to socio-economic disadvantage, may also lead to consuming palatable foods as way of coping [26, 36]. In line with this, two participants in our study reported occurrences of impulsive eating (i.e., consuming foods for the momentary reward with less

regard for the longer-term consequences). Together, our findings highlight the complexity of the impact of food insecurity on eating behaviours, and the potential mediating role of emotional distress.

Research has shown significant increases in foodbank usage in the UK over recent years [14]. Therefore, identification of personal experiences and ongoing issues in food-insecure populations is critical in developing effective and tailored public health approaches. There are existing initiatives to alleviate the cost of food and facilitate healthy eating patterns such as free school meals for children [15], however, few address the issue of income which our analysis suggests is the most salient factor. It is necessary to consider how to overcome low income in a sustainable manner and our findings suggest that addressing the cost and accessibility of healthy food, and supporting physical and mental health issues may contribute to alleviating the difficulty of managing a low budget. In a US-based qualitative study with low-income residents, participants reported that increasing the number of farmers' markets and community gardens would improve access to healthful foods [4], suggesting that these may be promising approaches for future research. But ultimately major upstream changes to the welfare system are needed as foodbanks only address one issue that food-insecure populations experience [37].

Strengths and limitations

To our knowledge, this is the first study to qualitatively explore factors that influence food choice and eating behaviour in food-insecure populations in the North West of the UK, an area of high socio-economic deprivation. We have shown similar issues to previous research conducted elsewhere in the UK [17, 21, 23, 24] which suggests that these factors are relatively consistent. We have also highlighted some of the food rationing strategies and differences in eating behaviour which occur in response to the experience of food insecurity. A further finding was that food-insecure populations appear to be in a recurring cycle of struggling to obtain food which seems to increase feelings of stress, anger and frustration and exacerbate physical and mental health issues.

Our study is not without limitations. We did not collect detailed demographic data on participants recruited in this study; therefore, it was not possible to explore differences in age or ethnicity. Secondly, we interviewed participants who lived on their own or who had dependent children, however, these groups were not proportionate thus we were unable to compare food choice and eating behaviour between them. Given feedback from four participants with dependent children who reported restricting food intake and choosing food based on children's preference, and previous research interviewing children [15, 25], there seem to be wider implications for child and caregiver eating behaviour which require further investigation.

Conclusions

Our study found that income was the biggest factor influencing food choice and eating behaviour in food-insecure populations with other issues such as the cost of food, accessibility to shops and health issues being additional contributing factors. We have shown that participants do not seem to lack the knowledge of preparing and cooking a healthy meal, instead they have little choice in the foods they purchase as they appeared to eat to survive. We have also shown that the inability to afford food and the stress and worsening health associated with this is a recurring cycle that participants struggle to break. Therefore, initiatives addressing income, cost and accessibility of healthy food, and support for mental health are required to improve food choice and eating behaviour in food-insecure populations.

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Supplementary Material

Interview Schedule:

1. Please can you tell me a little bit about your household and/or living situation. For example, do you live with other people, if so how many adults and/or children? Do you, or any other adults in your household, have a job?

2. What are the main ways of obtaining food in your household?

   Follow-up: Where do you tend to shop?

   Do you use any other ways to access food?

3. What sorts of foods do you choose for your household?

   Follow-up: What are the main factors which influence your food choice?

4. How do you feel about your household's current access to food?

   Follow-up: Are you ever worried that food might run out before you are able to buy any more?

   What strategies do you engage in to conserve your food supply?

   If you experience stress or worries about your food supply, how do you cope with this/how does this influence your thoughts, feelings and behaviour?

5. Do you feel that your access to food affects your life in other areas (e.g. physical health, wellbeing, health behaviours)?

6. What do you find to be the main barriers to purchasing and obtaining food in your local area?

   Follow-up: How do you think these barriers could be overcome?