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Navigating household food insecurity and environmental sustainability on a low income: An exploration of Sheffield mothers

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Abstract

In 2023, 25% of adults in England, Wales and Northern Ireland experienced food insecurity. The concentration of food insecurity in both socioeconomically disadvantaged groups and households containing children raises concerns about its uneven nutritional and health impacts across different groups. In parallel with rising food insecurity over the past decade, concerns about the environmental consequences of human diets are intensifying, where urgent changes are needed to people's diets to avoid irreversible environmental damage. It is generally assumed that cost has a significant impact on people's ability to adopt more environmentally sustainable food practices. This UK Research Council-funded project seeks to gain insights into the ways in which low-income mothers (are able to) engage with environmentally sustainable food practices. RQ1 will examine the day-to-day food practices that mothers undertake for their families to offer insights into everyday food insecurity and the relevance of environmentally sustainable food practices. RQ2 will explore biographical experiences to highlight how mothers' life histories influence their familial food practices, including their current household food security and engagement with environmentally sustainable food practices. Finally, RQ3 will explore mothers' upcoming prospects of food insecurity and environmentally sustainable food practices. These research questions will be explored through a qualitative longitudinal, feminist study of 15 low-income mothers in Sheffield, UK, combining in-depth interviews with ethnographic elements. Gaining improved knowledge of mothers' food practices on a low income will be valuable to influence realistic, effective and meaningful philosophies, policies and practical action that prioritises equity, good nutrition and environmentally sustainable food practices.

KEYWORDS

diet inequality, environmental impact, food insecurity, health inequality, qualitative longitudinal research, sustainable food systems

INTRODUCTION TO THE PROJECT

Household food insecurity (HFI) refers to people compromising on the quantity or quality of food, experiencing anxiety about food supplies lasting and acquiring food in socially unacceptable ways such as relying on

charity (Radimer et al., 1992). Understanding access to food as a basic and essential requirement of an adequate diet, food insecurity confers a high likelihood of nutritional inadequacies (Loopstra, 2018). While such experiences may seem reminiscent of Dickensian levels of poverty and hardship, HFI grew substantially

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over the past decade in the UK (Loopstra et al., 2019) and Europe (Loopstra et al., 2015), demonstrating its relevance as a contemporary public health priority. This growth has been attributed to a backdrop of rising living costs, diminishing security of work and 'radical and regressive' (Lambie-Mumford & Silvasti, 2020, p.199) gendered austerity measures (Edmiston, 2021). Ongoing growth in both HFI and food bank use, intensified by the national and global repercussions of the COVID-19 pandemic and subsequent cost-of-living crisis, has prompted the recognition of HFI as a health, social and policy emergency. Most recently, figures from the nationally representative *Food and You 2* survey show that in 2023, 25% of adults in England, Wales and Northern Ireland experienced HFI, while 4% had used food banks in the previous 12 months (Armstrong et al., 2024). During the same period, the Trussell Trust—who supply two-thirds of the UK's emergency food—distributed almost 3 million food parcels, a 120% increase in 5 years (The Trussell Trust, 2020). The UK therefore needs considerable progress to meet the UN Sustainable Development Goal (SDG) of achieving zero hunger worldwide by 2030.

The extensive and diverse negative consequences of HFI demonstrate the topic's research importance. HFI is associated with less nutritious diets, including lower protein, vitamin and mineral intakes (Kirkpatrick & Tarasuk, 2008), lower vegetable intake (Pilgrim et al., 2012) and disordered eating (Hazzard et al., 2022), collectively demonstrating a risk of nutritional vulnerability. Significantly, food insecurity is also associated with a wide range of adverse physical and mental health outcomes, demonstrating tangible impacts of HFI on people's lives. These include poor general health (Cook et al., 2004; Olson et al., 2004; Yau et al., 2020) and chronic conditions ranging from cardiovascular disease and diabetes to childhood asthma (Gucciardi et al., 2009; Mangini et al., 2015; Seligman et al., 2010; Tarasuk et al., 2013). Food insecurity is also associated with increased mental health difficulties in adults (Carter et al., 2011; Heflin et al., 2005; Power et al., 2017; Yau et al., 2020) and behavioural and emotional problems in children (Belsky et al., 2010; Melchior et al., 2009; Whitaker et al., 2006). Such dietary-related health inequalities run counter to SDG 10, to reduce inequalities.

Beyond its immediate impacts on diet, nutrition and health outcomes, HFI also has wider psychological impacts. In children, these include social exclusion (O'Connell et al., 2019) and reduced educational outcomes (Perez-Escamilla, 2012). In adults, HFI is associated with experiences of stigma, shame and embarrassment. Stigma can arise when people cannot afford to follow dietary guidelines (Pineau et al., 2021) or seek emergency food, framing such assistance as a 'last resort' (Garthwaite, 2016; Hanson et al., 2023; Purdam et al., 2015).

Unsurprisingly, HFI is not evenly distributed across the population and is instead concentrated in socio-economically disadvantaged groups, including those with low incomes, lower levels of education or who are unemployed (Bramley et al., 2021; Brown et al., 2022; Loopstra et al., 2019; Pool & Dooris, 2022). Moreover, evidence linking food bank use with receipt of state benefits (Bramley et al., 2021; Garratt, 2020) and benefit sanctions (Loopstra et al., 2018) demonstrates real and detrimental impacts of the wider policy climate. Importantly, the past 14 years of austerity have exerted a range of gendered impacts on women. Job losses and wage freezes resulting from the austerity goal of shrinking the public sector have disproportionately impacted women, who are more likely to work in the public sector than men. Welfare reforms resulting in reductions to the household benefit cap, benefit freezes and the two-child benefit limit have additionally disproportionately affected low-income mothers, especially lone-parent families who are overwhelmingly headed by women.

HFI is concentrated in households containing children, in 2023 affecting 34% of households containing children under 16 years and 40% of households containing children under 6 years (Armstrong et al., 2024). These elevated risks, especially for lone-parent households, have been replicated in multivariate analyses, suggesting particular vulnerability in these groups (Garratt and Armstrong, n.d.). Significantly, these associations are independent of household income, suggesting that non-financial factors also contribute to HFI. For example, time pressures that can translate into higher food costs may be especially acute in lone-parent households and require targeted responses from policymakers and nutritionists. Gaining improved understanding of these dynamics is therefore crucial to guide the development of effective support for vulnerable groups. This project will explore the day-to-day food practices that mothers undertake for their families (Beagan et al., 2008).

Alongside the rise in HFI, over the past decade practical, political and social concerns about the environmental consequences of human nutrition have also intensified. Food systems affect the environment across all stages of food production, consumption and waste management (Jurgilevich et al., 2016). Food systems harm the environment in a range of ways, including by contributing to climate change, biodiversity loss, demands on freshwater use and land use change (Rockström et al., 2009). One-third of food produced for human consumption is lost or wasted (Gustavsson et al., 2011) and wasted food accounts for 8% of human-caused greenhouse gas emissions (GHGEs) (WWF-WRAP, 2020). Overall, food contributes 20%–30% of global GHGEs (Kause et al., 2019), far exceeding the 5% of emissions from shipping and aviation (UNEP, 2020). Agriculture additionally accounts for 70% of freshwater use (FAO, 2021) and

threatens 86% of species at risk of extinction (Benton et al., 2021). These climate impacts directly harm human health, for example, global food system emissions account for 22% of mortality attributed to poor air quality (Crippa et al., 2022). Our current food systems are both key drivers of climate change and have immediate and longer-term effects on human health.

Improvements in the environmental impact of UK food systems—such as the 32% per capita reduction in food-related GHGs between 1986 and 2017—encouragingly demonstrate that significant progress is possible (Stewart et al., 2023). However, these improvements largely reflect improved efficiency in food production which cannot alone reduce GHGs emissions to target levels (Macdiarmid, 2013; Poore & Nemecek, 2018). Globally, diets must change to improve the health of both people and the planet (Bajželj et al., 2014; Steenson & Buttriss, 2021). In recognition of the significant and irreversible environmental impacts of human diets, recent UK and international calls have urged the transition to environmentally sustainable diets (for a summary, see Faculty of Public Health Sustainable Diet Working Group, 2023). Prominent responses include the 2019 EAT-Lancet Commission's Planetary Health Diet, proposed to optimise human health and reduce GHGs by 42% from 2017 levels (Stewart et al., 2023; Willett et al., 2019). The World Wide Fund for Nature's Livewell Plates are similarly designed to offer a nutritionally adequate diet while pursuing a 60% reduction in terrestrial GHGs by 2030 to limit global warming, alongside reduced land occupation and land use change (WWF, 2017).¹ In combining both health and environmental considerations, these diets demonstrate progress from longstanding dietary recommendations that focus solely on health promotion. At the policy level, the UK Select Committee on Food, Poverty, Health and the Environment was appointed in 2019 to 'consider the links between inequality, public health and food sustainability' (Select Committee on Food, Poverty, Health and the Environment, 2020, p.4), while SDG 12 aims to halve per capita global food waste by 2030. Yet, there are key challenges to adopting the lifestyle changes necessary to transition to sustainable diets, such as reducing meat consumption (Demska et al., 2022).

Concerns about the environmental sustainability of people's diets are increasingly being recognised by nutritionists. For example, the British Nutrition Foundation's 2023 Annual Conference *A fragile food system and increasing inequality*, demonstrates meaningful engagement with environmental sustainability questions among the nutrition profession. Likewise, the UK's Eatwell Guide has been reviewed and offers a 32% lower environmental

footprint than current dietary patterns (The Carbon Trust, 2016). Yet, this progress has not been matched by clear, practical, evidence-based initiatives to promote environmentally sustainable diets (Lonnie et al., 2023). People's ability to adopt more environmentally sustainable food practices reflects multifaceted considerations, including motivations, accessibility and material and financial resources. It is here that questions of food insecurity intersect with those relating to environmentally sustainable food practices. Existing research reports that environmentally sustainable food practices are concentrated among financially advantaged groups (Armstrong et al., 2021; Paddock, 2015; Reynolds et al., 2019; Wrieden et al., 2019) and such practices may, understandably, be downgraded or abandoned as a coping strategy to resist HFI (Hall, 2015; Radimer et al., 1990). Environmentally sustainable food practices have nonetheless been reported among low-income groups (Goode, 2012; Huddart Kennedy et al., 2019; O'Connell & Brannen, 2021; Power et al., 2021; Salonen, 2021). It would therefore be a mistake to suggest that environmentally sustainable food practices are incompatible with low incomes. Indeed, quantitative research revealed that French diets with the lowest GHGs were significantly cheaper, due primarily to lower consumption of red meat, alongside higher consumption of fruit and vegetables (Seconda et al., 2018). However, in the UK, adults experiencing HFI reported fewer concerns about the environmental impact of food and wasted more cooked and purchased food (Armstrong et al., 2021). The dynamics of food security, diet and diverse environmentally sustainable food practices are therefore complex and potentially contradictory.

Recognising this interplay of environmental sustainability motivations and material influences on food practices, the Sustainable Development Commission recommended that government advice on sustainable diets ought to consider circumstances including financial background (Sustainable Development Commission, 2009). Accordingly, Livewell Plates devised by the World Wide Fund for Nature included cost calculations, reporting that these diets cost only 1.5% more than current diets (WWF, 2017). Yet in research, these intertwined topics have remained largely detached. For example, existing research has separately explored concerns and practices relating to environmental sustainability (Paddock, 2015) and the quality, cost and nutritional value of food in low-income settings (O'Connell et al., 2019). Consequently, the potential connections between these considerations, such as reducing meat intake for financial, health or environmental sustainability reasons have generally remained unexplored. Improved understanding of the barriers and enablers to pursuing an environmentally sustainable diet on a low income is vital to influence philosophies and practical actions that are realistic, effective and integrated. The project therefore seeks to

¹ The LiveWell Plates emissions reduction goal is taken from the Paris Agreement, which seeks to reduce man-made GHGs to levels that translate to an average temperature rise of 2°C from pre-industrial levels. For the UK, this target equates to a 61% reduction in emissions from 1990 levels and has been rounded down slightly for the LiveWell Plates targets.

answer important questions about the ways in which low-income groups (are able to) engage with environmentally sustainable food practices and to interrogate the complex and potentially contradictory nature of these practices. The project's qualitative approach will enable a detailed exploration of low-income food practices over three timescales: past, present and future. The project's timing (2023–2025) within the ongoing cost-of-living crisis will also offer insights into the resilience of existing environmentally sustainable food practices to new or deepening experiences of HFI and poverty and the retention of these commitments in times of financial scarcity.

Research questions

1. Research Question 1 (RQ1) will examine mothers' day-to-day familial food practices. It will examine the everyday temporal dynamics of HFI, its short- and longer-term determinants and mothers' engagement (if any) with environmentally sustainable everyday food practices (*present*). Associations between environmentally sustainable food practices and social background are complex and poorly understood. Questions about the extent to which low-income groups can and do, engage with environmentally sustainable food practices have received limited research attention. Improved knowledge of engagement (or not) with environmentally sustainable food practices within low-income settings will be valuable in influencing realistic, effective and meaningful actions by nutritionists and others.
2. Research Question 2 (RQ2) will explore biographical experiences to identify how mothers' life histories influence their familial food practices, including their current HFI and the salience of environmentally sustainable food practices (*past*). Links between biographical events and food practices suggest that adverse early life events perpetuate poverty and intergenerational HFI (Jackson & Vaughn, 2017), such as by undermining confidence (Blake, 2019), interrupting food provisioning strategies (Beagan et al., 2008) and disrupting support systems (Bramley et al., 2021). Likewise, the resilience of existing environmentally sustainable food practices to financial scarcity and new HFI remains unknown. These considerations have not yet been explored in detail, despite their relevance to policy and practice.
3. Research Question 3 (RQ3) will interrogate future expectations to consider mothers' upcoming prospects of HFI and environmentally sustainable food practices (*future*). RQ3 will explore the ways in which low-income mothers foresee their food practices and HFI status changing over time (and reasons for this), the anticipated relevance of environmentally sustainable consumption in their future food practices and

reasons why the salience of environmental sustainability considerations might vary over time and in relation to HFI status.

RESEARCH DESIGN AND METHODS

Research methods

The research team will collect rich, in-depth qualitative longitudinal data using complementary interviewing methods to explore Sheffield mothers' food and environmentally sustainable food practices while living on a low income. The primary data will be contextualised by a supplementary quantitative work package comprising secondary analyses of key UK datasets. We will invite mothers to participate in up to three fieldwork episodes, combining in-depth semi-structured interviews, a life history interview and an ethnographic interview over a 15-month period. Notably, we will also interview members of women's networks (e.g. partners, friends, parents and siblings) and representatives from local public and third-sector services. Interviews with mothers and network members will attend to temporality, lived experiences, social networks and spatiality. The project's qualitative approach will enable a deep exploration into familial food practices and how these are impacted by barriers and enablers including motivations, accessibility, time, energy, food preferences and material and financial resources that are not consistently incorporated in reference diets optimised for health and environmental sustainability.

Our approach is embedded in feminist methodological principles throughout, from design, recruitment and data collection, to analysis and dissemination. Feminist research centres the knowledge and experiences of participants. It requires researchers to reflexively attend to power dynamics, both within research encounters (Cotterill, 1992) and in representations of participants' experiences in project outputs (DeVault & Gross, 2012). We are committed to pursuing an ethically sensitive, reflexive and non-exploitative approach, which is fundamental to researching sensitive topics, particularly with participants at risk of marginalisation. In practice, this involves avoiding stigmatising participants, respecting the time and knowledge that participants share and ensuring ongoing consent. Reflexivity requires us to maintain a dynamic self-awareness, attending to and challenging our influences and responses during the research process, as meaning is co-constructed (Etherington, 2004). The research team consists of two white women who are experienced in undertaking research with disadvantaged communities and on sensitive topics. One is the mother of a school-aged child. The project has been approved by the University of Sheffield's research ethics committee (reference: 055002).

Qualitative longitudinal research methods are used to explore change over time, capturing the dynamic and complex relationships between individual lives and broader patterns of social change (Neale et al., 2012). In qualitative longitudinal research, it is the methodological approach, rather than the length of time taken or number of fieldwork episodes, which is significant. The approach requires temporality to be a key feature of both research design and data collection. Researching *through* time enables the dynamic and relational nature of lived experiences to be explored (Corden & Millar, 2007; Saldaña, 2003). Accordingly, our project will encourage participants to reflect on food provisioning over three timescales: past, present and future. We plan to interview mothers three times, developing topic guides directly in response to earlier interviews. Returning to participants also allows them to reflect upon their experiences during later interviews, which has the potential to shape the interview dialogue and amplify the depth and nuance of women's accounts. Our qualitative longitudinal approach will offer detailed insights into points of transition and change such as maternity leave and children starting school alongside more fluid, everyday changes to familial food practices. Our approach will bridge current knowledge gaps around low-income food provisioning and the salience of environmental factors because it centres the dynamics of family life while capturing change.

Our first in-depth interview will focus on mothers' everyday food practices from start to finish, beginning with meal planning and ending with how leftovers are managed. Taking a holistic approach seeks to incorporate not only instrumental food practices such as shopping and cooking, but also less visible tasks including planning and budgeting (Beagan et al., 2018). Furthermore, it offers insight into the challenges that go beyond the material and financial, encouraging reflection, for example, on (physical and mental) energy, emotion and time. Environmental sustainability will be examined through a card-sort activity in which mothers explore their current understanding of and engagement (or otherwise) with environmentally sustainable food practices such as eating less meat, composting and avoiding food waste.

Approximately 6 months later, mothers will be invited to take part in a life history interview. This will explore how women's life histories influence both the salience of environmental sustainability questions and their current HFI experiences, enabling us to explore the dynamic and relational nature of lived experiences (Corden & Millar, 2007; Saldaña, 2003). Finally, an ethnographic interview will explore the social-locatedness of mothers' everyday lives and their food provisioning and environmentally focussed tasks. Ethnographic methods typically involve a researcher directly immersing themselves in a community for

sustained periods, observing daily life in context O'Reilly, 2009. Our use of ethnographic interviewing offers the strengths of ethnographic methodologies where a 'full' ethnography may be impractical for both researchers and participants. In place of extended periods of participant observation, interviews will be combined with ethnographic observations of food practices such as meal planning, shopping, cooking and serving food. Like qualitative longitudinal approaches, the methodological and conceptual value of short ethnographies is not in the length of time, but in generating 'intense routes to knowing' (Pink & Morgan, 2013, p.351) that enable 'intensive excursions' (p.352) into people's everyday experiences, creating understanding between researcher and participant. Incorporating an ethnographic approach is particularly appropriate for topics defined by active tasks—such as food practices—where observations have specific potential to enhance interview accounts (Hall et al., 2020).

We are mindful of the challenges of maintaining our sample over time. As such, time, effort and resources have been allocated to support participants' ongoing engagement. Our feminist approach will encourage ongoing, personalised participation in a flexible and ethically sensitive way. Where possible, contact with mothers who speak English as an additional language will be maintained through English-speaking friends or family members. All participants will receive a £30 multi-shopping voucher for each fieldwork wave they engage with, to reflect the time and knowledge that participants share with us while not coercing participation.

Sample and sampling strategy

Our sample will include 15 mothers in Sheffield, UK who have dependent children and are currently or have recently experienced, living on a low income. As noted, like poverty, HFI is concentrated in households with children, especially lone-parent households (Garratt and Armstrong, n.d.). The intergenerational reproduction of poverty and HFI (Hanson et al., 2023), the changing needs and circumstances of households with children and the high and growing number of children supported by food banks (Bramley et al., 2021; Garratt, 2017) make families with dependent children particularly suitable for exploring temporal dynamics. Environmentally sustainable food practices are likewise pertinent as households containing children report less pro-environmental behaviour (Longhi, 2013) and waste more food (Armstrong et al., 2021). Our focus on the broader experience of low income reflects both the possibility that the term 'food insecurity' is poorly understood and that some potential participants may not identify themselves as experiencing

food insecurity. To avoid stigmatising participants, low income will be self-defined and we will not undertake formal assessments of income or HFI. The purpose of this project is not to quantify HFI using predetermined, standardised measurements. Instead, the project's interpretivist epistemology leads us to focus on capturing detailed experiences and understandings of HFI and its impacts on people's lives.

Researching specifically with mothers (or other female caregivers²) reflects gendered labour divisions and mothers' longstanding responsibility for food provisioning (Beagan et al., 2008; Charles & Kerr, 1988). Mothers—and women more broadly—have historically borne responsibility for the material and emotional domestic labour of planning meals, shopping and cooking (Devault, 1991; Pember Reeves, 1913) and taking responsibility for nutrition (Pineau et al., 2021), alongside managing poverty more broadly (Goode, 2012; Power, 2005). Existing research into familial food practices is overwhelmingly female-focussed, for example, in their exploration of food practices in the transition to parenthood, Stapleton and Keenan (2009) interviewed mothers, who also reported their male partners' views and experiences on their behalf, while Goode (2012) interviewed heterosexual couples together. Dedicated research with men has focussed on men leading highly precarious lives (e.g. Machray & Haddow, 2024). Men's direct perspectives on familial food practices and the wider familial determinants of food practices and diet are therefore absent from scholarship.³ Additionally, the concentration of environmentally oriented domestic behaviours in women further demonstrates interconnections between gendered HFI and environmental sustainability themes that require dedicated research (Oates & McDonald, 2006; Waitt et al., 2012; WRAP, 2020). Both methodologically and substantively, our approach therefore speaks to feminist motivations to amplify the experiences of women and their families.

Recruiting a target sample of 15 low-income mothers will enable us 'to understand intricacies, nuances and depths' (Hall, 2019, p.18) and facilitate detailed analytical rather than empirical generalisation. The chosen sample size reflects both practical and ethical considerations, specifically the research team's capacity to be fully engaged with participants for the project duration. We will draw a purposive sample to capture diversity in family structure, ethnicity, number of children and income source(s). We will seek to recruit mothers of differently aged children to enable us to explore experiences of food provisioning in families with diverse and changing needs, dynamics and pressures. We will recruit via local services, including those offering instrumental and

wider support to low-income groups, food aid organisations, community spaces such as libraries and leisure centres and on social media. We have included interpreter costs in the project budget to enable mothers who speak English as an additional language to take part.

The research team will also interview members of mothers' networks, such as partners, friends, parents or siblings. This component will serve to explore the research questions through multifaceted relational lenses to offer wider perspectives and explore decision-making and social influences on food practices. Interviewing network members will enable the research team to explore the lived experience of HFI among other family members and offer new perspectives on the dynamics of environmentally sustainable food practices within families. This feature does not seek (nor would it be able) to make formal comparisons between the scale or impact of food insecurity on men and women or between different family members. Including network members will instead enable a rich exploration of relational food practices, where food is not an individualised experience but is instead embedded in familial and other relationships. The opportunity to explore these relational aspects through a generational lens brings further temporal depth, supporting our longitudinal approach. Interviewing male network members such as male partners will offer explicit and direct insights into relational, gendered and heteronormative food practices within households. The project's explicit exploration of gender will therefore enrich empirical and theoretical understandings of food practices. Network member interviews will be scheduled during later fieldwork waves, once the researchers are familiar with mothers. Finally, we will interview six local statutory and third-sector service representatives to provide background information about the local service landscape to contextualise participants' accounts and build links with policy (Creswell & Miller, 2000). These services will be selected purposively to provide diverse accounts.

Project location

The project will be conducted in the city of Sheffield, UK. In 2021, an estimated 2.5% of adults in the Sheffield local authority reported hunger, 8.1% struggled to access food and 11.4% worried about food provisioning (Moretti et al., 2021). In 2022/2023, 30% of state primary and 33% of state secondary school pupils in Sheffield were eligible for Free School Meals,⁴ figures that are

² Purdam et al. (2019) drew attention to older women experiencing HFI who were supporting both children and grandchildren.

³ Indeed, the Trussell Trust's 2021 State of Hunger report called for gendered qualitative research into HFI (Bramley et al., 2021).

⁴ Eligibility rules for free school meals are complex and geographically variable. Broadly, free school meals are available to two groups of pupils in England. First, universal free school meals are available to children in reception, year 1 and year 2 (children aged approximately 4–7 years old). Second, means-tested free school meals are available to low-income school pupils aged 7–18 whose parents receive specific out-of-work benefits.



substantially higher than the national averages of 24% of primary and 22% of secondary school pupils (Department for Education, 2024). The scale and depth of deprivation in Sheffield are therefore significant, making Sheffield a relevant setting to explore low-income food practices. Equally, such patterns of deprivation are unfortunately not unique to Sheffield, so the project findings will be transferable elsewhere in the UK. Against this backdrop, significant state, civic and community anti-poverty engagement exists across the city. Voluntary Action Sheffield's Food Provision Map lists 30 organisations, including food banks, social supermarkets and free- or low-cost community cafes (VAS, 2024). In 2020, Sheffield City Council formed a cross-party Food Poverty Working Group to improve the council's response to food poverty, while 'Fairer, Healthier, Greener: A Food Strategy for Sheffield' 2022 demonstrates the city's commitment to both immediate and future access to food. Undertaking research in Sheffield therefore offers an ideal setting to explore food poverty and sustainability alongside diverse support networks and the role these play in supporting low-income families.

Analysis

Interview data will be audio-recorded (with consent) and then professionally transcribed verbatim, before being checked and pseudonymised by the research team. We will employ reflexive Thematic Analysis, which provides conceptual flexibility while supporting rigour (Terry & Hayfield, 2021). The research team will familiarise themselves with the interview data through repeated listening, reading and notetaking, then coding and collating pertinent potential themes. Fieldwork notes, including ethnographic observations, will also be incorporated to prompt further reflection and depth.

Supporting our reflexive approach, analyses will be iterative and discursive. Engaging in analysis as a team of researchers is beneficial here. Discursive approaches, in which the research team shares and revisits codes and emerging themes, will provide opportunities to attend to our differing subjectivities within the analytical process. Doing so supports the next steps of refining and consolidating meaningful themes, embedding these in existing theoretical and conceptual literature. This is particularly relevant when exploring the novel intersections and tensions between food insecurity and environmental sustainability practices. As outlined, a commitment to researching through time is central to qualitative longitudinal research and engaging analytically with the temporal and spatial is central to developing our themes (Saldaña, 2003). Analysis of interview data with mothers and their network members will be triangulated, focusing on dynamic and relational aspects of food practices. This approach seeks to generate analytical depth, diversity and nuance and

to highlight points of similarity and difference that will contribute to more complete accounts of familial food practices. Contextual insights from interviews with services will be incorporated into participants' accounts to contribute to policy-relevant analyses and outputs.

Quantitative work package

The project's qualitative component will be contextualised by a supplementary quantitative work package comprising secondary analyses of key existing UK datasets. Exploring the Family Resources Survey (2019-) and Understanding Society (2021-) will offer insights into the prevalence and persistence of HFI using standardised measures (RQ1). Analyses of the *Food and You 2* survey (2016-) will focus on the relationship between income, HFI and environmental sustainability to provide a broader picture of low-income food practices and the prominence of environmentally sustainable food practices among people of different social backgrounds (RQ3). They will also explore environmentally sustainable food practices in a nationally representative sample to offer insights into whether and how these practices vary according to gender and social and financial background (RQ3). The quantitative analyses will comprise descriptive and multivariate analyses to contextualise the project's main qualitative findings.

Dissemination and impact

Dissemination activities will target both academic and non-academic audiences. A dissemination event will be held at project close to facilitate engaging and accessible knowledge exchange among participants, local public and third-sector organisations, national and local policymakers, commissioners and academia. Incorporating presentations, panel discussions and workshops, the event will showcase the project findings, share its academic and non-academic value, facilitate discussions and networking, gain policy and media interest, explore next steps and thank participants. Tailored project outputs for professionals and participants will be circulated. Research articles will be submitted to relevant high-ranking peer-reviewed journals. We will seek wide dissemination through a general press release and pitching specific pieces to national and local news outlets such as the Guardian Society, Huffington Post, The Conversation and Radio 4. The project data and documentation will be deposited in the UK Data Archive.

CONCLUSIONS

UK food insecurity has grown dramatically over the past decade, alongside intensifying concerns about

the environmental consequences of people's diets. Urgent changes are needed to current food systems and dietary patterns to minimise the damaging effects of human diets on the environment and to promote food security and nutritious, health-promoting diets. Our project will explore three novel research questions relating to familial food practices: First, by examining mothers' day-to-day familial food practices it will offer insights into short-term HFI dynamics and the role (if any) played by environmentally sustainable food practices (RQ1). Second, by exploring biographical experiences, it will highlight how mothers' life histories influence both the salience of environmental sustainability questions and their families' current HFI experiences (RQ2). Finally, interrogating future expectations will explore upcoming prospects of HFI and environmentally sustainable food practices in low-income families (RQ3). The project will combine the interconnected topics of HFI and environmentally sustainable food practices, which have to date been largely explored separately despite strong interlinkages. We are especially interested to explore mothers' engagement (if any) in pursuing an environmentally sustainable diet on a low income, the barriers and enablers they face and to reveal the complex and potentially contradictory nature of these practices. This context provides clear justification for richly detailed interdisciplinary longitudinal qualitative research that will explore these temporal dynamics in food practices over the past, present and future. Our methodological approach will allow us to interrogate *why* these dynamics might occur and highlight the social, economic and environmental contexts they occur *within*. Improved knowledge of environmentally sustainable food practices within lived experiences of low income will be valuable to influence realistic, effective and meaningful philosophies, policies and practical action that prioritises nutritious and environmentally sustainable, socially just futures for both people and planet.

AUTHOR CONTRIBUTIONS

Elisabeth A. Garratt: conceptualisation, funding acquisition, investigation, methodology, project administration, resources, writing—review and editing. Christine Jackson-Taylor: conceptualisation, investigation, methodology, project administration, resources, writing—original draft, writing—review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to disclose.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no data-sets are yet available.

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