COVID-19 pandemic and food poverty conversations: Social network analysis of Twitter data

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Abstract
This novel and mixed-method study investigated food poverty conversations at the beginning of the COVID-19 pandemic and the subsequent national lockdown on the social media platform Twitter. NodeXL Pro software was used to collect tweets using the terms ‘food’ and ‘poverty’ in any order somewhere in a tweet sent on selected days between April 5 and May 23, 2020. The data obtained from NodeXL Pro were cleaned. Social network analysis tools were used to analyse and visualise our data. Using this method, sentiment-related words (positive or negative words), the top (the most mentioned) 10 hashtags, top words and top word pairs were identified. The patterns of word pairs communicated in our network were visualised based on each word pair’s frequency. This also enabled us to carry out a content analysis to create coding of the word pairs’ data. A total of 81,249 tweets were identified that contained the terms ‘food’ and ‘poverty’. Our findings revealed that individuals’ tweets overwhelmingly contained views about the increase in hunger, food poverty and food insecurity due to the COVID-19 pandemic. Twitter users perceived that when the pandemic measures began, many food-secure families were pushed into food insecurity due to a rapid rise in unemployment and rising poverty due to the quarantine and stay-at-home instructions in place at the time. They also addressed the sharp rise in food poverty being driven by panic buying, food shortages, food affordability and disruptions in food supply and food systems. Our analysis of this data suggests that to mitigate food poverty or to prevent a ‘hunger pandemic’ for future pandemic emergencies, comprehensive and longer term policy responses and economic supports are needed to strengthen the resilience of food systems. However, the highlighted limitations of this study must be considered.

KEYWORDS
coronavirus, COVID-19, food poverty, pandemic, social network analysis, Twitter data
The novel infectious coronavirus disease (COVID-19) was first reported in December 2019 and was characterised by the World Health Organization (WHO) as a pandemic on 11 March 2020 (World Health Organization, 2021). Since then, it has affected over 250 million people worldwide with more than 5 million confirmed deaths as of 10 November 2021 (World Health Organization, 2021). COVID-19 has caused major disruptions in daily life by home quarantine, social distancing, travel restrictions, the closure of schools and non-essential businesses. It has also illustrated the fragility of our ‘just-in-time’ food system and how people provide food for themselves (Fraser, 2020). Recent evidence reports that the COVID-19 pandemic has exacerbated the situations for households experiencing food insecurity and food poverty (also referred to as household food insecurity) rapidly increased during this crisis (Beacom et al., 2020; Wolfson & Leung, 2020). Food poverty, a condition defined as the inability to afford or to have access to foods that make up a healthy diet (Forsey, 2014), is associated with poor health outcomes in both the short- and long-term. People living in food poverty and food insecurity (referred to as food poverty in this paper) have been reported to have poor-quality diets and are more likely to have nutrition-related chronic diseases such as obesity and diabetes; this risk increases as severity of food insecurity increases (Ashton et al., 2014; Cook & Deborah, 2008; Ryu & Bartfeld, 2012; Stuff et al., 2004). According to the United Nations (UN) World Food Programme’s report, 135 million people around the world were facing severe food insecurity before the coronavirus pandemic (at the beginning of 2020). Due to COVID-19 impacts, the UN estimated that global food insecurity doubled to 265 million by the end of 2020 (Global Food Security Program, 2020), with impacts expected to continue through 2021/2022, and possibly beyond because of the resulting economic crises and reduced food access (The World Bank, 2021). At the beginning of the COVID-19 pandemic, there was stockpiling and hoarding of food by consumers. These behaviours resulted in empty supermarket shelves in some countries, as well as threatening the food security of more vulnerable groups (Power et al., 2020). In the UK, although there has not been routinely collected national data on household food insecurity, the UN estimated 8.4 million people experienced food insecurity and this point was emphasised by the UN Special Rapporteur Philip Alston in 2018 (Eskandari et al., 2019). As a result, the use of foodbanks (charity or independent organisations that supply donated food to clients free of charge) has been continuously increasing (Fallaize et al., 2020). The Trussell Trust, the UK’s largest non-governmental food aid franchise that runs foodbanks, distributed 1.6 million 3-day food parcels between April 2018 and March 2019, a 26-fold increase on 2010 (Power et al., 2020). During the first 6 months of the pandemic, foodbanks in the Trussell Trust’s network reported a nearly 50% increase in need, with more than 1 million emergency food parcels distributed to people in crisis between April and September 2020 alone (The Trussell Trust, 2021). However, evidence suggests that not everyone suffering from food insecurity goes to a foodbank as they might feel too embarrassed or stigmatised by themselves or by others (Caplan, 2020).

During the unfolding coronavirus pandemic, the Internet became an important platform to obtain information about COVID-19 (Effenberger et al., 2020). Social media platforms have become an important information source for a subset of the population (Ahmed et al., 2020). The integration of these social network services (SNSs) into health communication activities has provided the opportunity for health communicators to help spread key messages and influence health decision making by encouraging participation, conversation and community (CDC, 2011; Jain et al., 2020). One of these social media platforms that has grown rapidly is Twitter (Harris et al., 2014). Twitter is one of the most popular and well-known free microblogging service systems that is used by millions of people, organisations and businesses to discover and share their thoughts, feelings, opinions, new information and observations by short messages (CDC, 2011; Diddi & Lundy, 2017; Larsson & Moe, 2012; Yoon & Bakken, 2012). There are other SNSs such as Facebook, Instagram and TikTok (Eghtesadi & Florea, 2020); however, Twitter has been the focus of most studies on social media published in medical journals (Tursunbayeva et al., 2017). Twitter has also been the focus of the most studies conducted by social media researchers since its data are more accessible to researchers compared to other networks such as Facebook (Williams et al., 2017). There have been calls from recent research to better understand public reactions related to COVID-19 on social media platforms (Ahmed et al., 2020). One of the software tools that can be used to collect, analyse and visualise social media network data from Twitter is NodeXL Pro. The NodeXL Pro software is an add-in for Excel 2010/2013/2016 and is produced by a not-for-profit organisation called the Social Media Research Foundation. This organisation is committed to create open tools, open data and open scholarship related to social media (Pew Research Centre, 2014). There have been limited studies to date reporting the application of this tool (e.g. Ahmed et al., 2020).

To the best of our knowledge, there are currently no publications studying the use of NodeXL Pro, as a social networking metrics analysis tool, to study food poverty conversations during the COVID-19 pandemic using...
Twitter data. Exploring Twitter conversations about food poverty gives a timely insight into the discussions that are happening about important public health and social issues during an unprecedented time. The overall aim of this study was to develop a better understanding on how and what Twitter users communicated about food poverty from the beginning of 2020 COVID-19 pandemic (5 April 2020 equivalent to Week 3 of coronavirus lockdown in the UK) until 23 May 2020 (Week 9 lockdown). We aimed to identify the main topics considered under the ‘food’ and ‘poverty’ terms. These terms were searched rather than ‘food’ and ‘insecurity’ because this research was conducted in the UK and there has been no established government-endorsed indicator or definition of food poverty in the UK prior to the recent 2019 decision by government that food poverty will be systematically measured (Beacom et al., 2020). Although food poverty and the wider term of ‘food security’ are influenced by the principles of food availability, access, utilisation and stability, food security is used at a national and global level to address whether countries have an adequate and safe food supply for their populations. However, food poverty is recognised as being mainly concerned with the access element at the household level (Beacom et al., 2020). In high-income countries such as the US and UK, the household level inability to access adequate food is more problematic than issues related to food availability and utilisation. This is commonly termed ‘food poverty’ in the UK and ‘household food insecurity’ in countries such as the US and Canada (Beacom et al., 2020).

This study aimed to answer the following questions: What discussions were taking place on Twitter at the beginning of the COVID-19 pandemic related to food poverty within the specified time? What hashtags and words appeared to be the most mentioned related to food poverty? What distinct word-pair groups emerged by social network analysis (SNA)?

METHODS

Data collection

The random sample of Twitter data used in this study were collected using NodeXL Pro software, every 2 weeks from Twitter: Sunday, 5 April 2020 (equivalent to Week 3 coronavirus lockdown in the UK), Monday, 20–21 April 2020 (Week 5 lockdown), Tuesday, 5 May 2020 (Week 7 lockdown) and Saturday, 23 May 2020 (Week 9 lockdown). The reason for collecting our data from these selected days within a 2-month period was because NodeXL Pro is limited by Twitter’s public free application programming interface (API). This means that data collected using NodeXL Pro are only available from the past 8–9 days and queries can return around 18 000 tweets on each search (The Social Media Research Foundation, 2016). These temporal ranges were, therefore, chosen to control these limitations.

All tweets gathered for this study either contained ‘#FoodPoverty’ hashtag or ‘food’ and ‘poverty’ keywords or were mentioned or posted in response to tweets that included these hashtag and keywords. Hashtags are about specificity that allow people to easily follow their interested topics by categorising and giving context to the tweets (Hartshorne, 2020). The collected information is related to different variables for each individual Twitter user such as full name, description, location information, web address in the profile, number of followers, date of account creation, date of last tweet, total number of tweets and custom profile picture. In this research, we did not identify individual Twitter users, the most influential individuals or key players as the purpose of this study was to identify the conversations taking place on Twitter. Recent ethical guidelines state that if seeking informed consent from the Twitter users is not possible, then researchers need to conduct their analysis only on depersonalised and anonymised data (Williams et al., 2017). Based on such ethical guidelines, researchers should only publish a tweet without seeking consent from a user if that tweet is from a public figure account such as politicians and celebrities (Yoon & Bakken, 2012). Therefore, in the current study, we did not obtain consent from individuals whose profile complies with the above definition of ‘public figures’ and we only included anonymised tweets. Ethical approval was granted by the chair of the Ethics Committee for the School of Health and Life Sciences at Teesside University, UK (reference number 6939 approved on 04/06/2020).

Data cleaning

As there were repeated sets of nodes (individual users within social media network) on the edges (relationships or connections among social users; Clemente et al., 2016) in our data obtained from NodeXL Pro, the data were cleaned by removing and merging the duplicate edges.

Data analysis

Social network analysis was used to identify sentiment-related words (positive or negative words), top (the most mentioned) 10 hashtags, top words and top word pairs. SNA is the process of investigating social networks using graph theory to map and measure the relationships between people, groups, organisations and other sources of information that are connected (Mulder, 2018; Otte & Rousseau, 2002). NodeXL Pro was used
to automatically identify sentiment-related words (i.e. these words were defined by the programme not by the researcher). NodeXL Pro uses the Opinion Lexicon (a list of English positive and negative opinion words or sentiment words) developed by the University of Illinois at Chicago to identify a word or phrase that is positive or negative (Smith et al., 2010). NodeXL Pro also found the top 10 hashtags, replies-to and mentions for our imported Twitter data (Ceni, 2018).

**Visualisation of word pairs**

The study of top word pairs (i.e. two words that appear together the most) makes it easier to establish the most important combinations of the words for sentiment analysis. The word pairs that appear most of the time, in the tweets, are placed in the same clusters and the word pairs that have fewer combinations are placed in other clusters (Singh et al., 2020). Thus, in this study, word pairs were visualised to gain a better understanding of SNA for imported Twitter data since there were more than 40,000 word-pair edges in each of our networks. Different studies have used different cut-off values to create graphs for the visualisation of word pairs (Chang et al., 2016; Ferra & Nguyen, 2017). For our study, a cut-off value of more than 10 times covered all the words related to the topic and enabled us to develop a graph with a minimum overlapping of words. Afterwards, relevant programmes in NodeXL Pro such as ‘degree and betweenness centrality score’ of each word were used to show which word pairs were repeated more frequently than others. By doing this, we were able to see the most important words in our network. This also enabled us to carry out an evaluation (content) analysis to create coding of the word pairs data. The summary of our methods can be seen in the following flow chart (Figure 1).

**RESULTS**

**Social network analysis (SNA)**

The data sets used in this analysis consisted of 63,919 Twitter users and 81,249 tweets that contained the terms ‘food’ and ‘poverty’. Using SNA, we identified the top 10 hashtags in tweets that were used by most of the Twitter users from Sunday, 5 April 2020 to Saturday, 23 May 2020 (Week 3 to Week 9 of UK lockdown; see Table 1). The results of SNA for obtaining the top words in tweets is shown in Tables 2 and 3. For ‘food poverty’, the frequency of words flagged as positive and negative sentiments are not equal for this sample of tweets. There were 62,502 positive words, but 152,640 words reflected negative comments about the topic of food poverty. The remaining words were ‘non-categorised’ which were either neutral (i.e. they were not found under positive and negative words categories), or because they were written in a language other than English (Table 2). Our search was done for English-language tweets; however, NodeXL Pro software also captures those tweets that use combination of both English and a different language. Although we have excluded non-English words during data cleaning process, very few non-English words remained by error as the data sets used for the study were large (there were 81,249 tweets).

**Evaluation (content) analysis**

The overall patterns of word pairs communicated in our network based on each word pair’s frequency were visualised for each time period (i.e. Week 3 to Week 9 of UK lockdown). The details of visualised word pairs were different for each data set of the four time periods; however, similar overall patterns were observed
for each of these data sets. As a consequence, one image was selected to avoid repetition (Figure 2). The overall patterns of word pairs communicated in our networks indicated that the words ‘food’ and ‘poverty’ appeared as bigger nodes which means they were repeated more frequently than others that appeared in the graph (Figure 2).

As shown in Figure 2, groups 1 and 2 were the biggest groups for all our data. A more focused view of Figure 2 indicates patterns of word pairs used more than 10 times in Group 1 for the data obtained from 5 to 6 April 2020 (Figure 3). For all the data obtained from Sunday, 5 April 2020 to Saturday, 23 May 2020, the most relevant nodes in group 1 (G1), in terms of frequency, were related to ‘food’, ‘access’, ‘social’, ‘care’, ‘afford’, ‘poverty’, ‘lockdown’, ‘#covid19’, ‘health’, ‘crisis’, ‘pandemic’, ‘insecurity’, ‘support’ and ‘government’. Figure 4 displays the results of the themes we obtained from coding of these word pairs alongside examples of anonymised tweets.

In group 2 (G2) for our data, the most relevant nodes, in terms of frequency, were related to ‘poverty’, ‘more’, ‘help’, ‘support’, ‘need’, ‘poor’, ‘families’, ‘lockdown’, ‘covid-19’, ‘provide’, ‘aid’, ‘enough’, ‘emergency’, ‘community’, ‘parcels’, ‘lack’, ‘nutritious’, ‘world’ and ‘hunger’. The results of the coding for these word pairs alongside examples of anonymised tweets can be found in Figure 5.

Other clusters in the peripheral groups also covered important words discussed in the network. For instance, ‘panic’, ‘buying’, ‘food’ and ‘shortages’ were repeated more frequently in G9. According to the themes obtained from the coding of these word pairs, lockdown measures during COVID-19 were criticised as the cause of panic buying and food shortages. Tweet extracts from coding of these word pairs include:

In my country there were 44 deaths; 2700 hospitalisations from the flu this winter, nearly 6 times the number for covid19, now the world is locked down with millions unemployed, panic buying; risk of food shortages= poverty, malnutrition and unrest. That can kill millions.

Also, ‘poverty’, ‘cheap’, ‘unhealthy’, ‘food’ and ‘obesity’ were frequently mentioned in G20. Obesity, as the result of poverty and eating of cheap unhealthy food, was referred to as an important factor to explain why coronavirus death rate was higher in some specific places in comparison to other places. Tweet extracts from coding of these word pairs include:

Poverty. Fat, unhealthy food is cheap. Most people who live in and around New Orleans are service workers, and live at or below the poverty level. Why is New Orleans' coronavirus death rate seven times New York's? Obesity is a factor.
Although no geographical restrictions were placed on tweets gathered in this study, we did not identify regions of tweets posted as the purpose was to indicate the conversations taking place on Twitter. However, the content of tweets revealed that many of them were posted by those in the UK and US.

**DISCUSSION**

In light of the ongoing COVID-19 (coronavirus) pandemic, this is the first research that investigated Twitter conversations around ‘food poverty’. Our analysis illustrated the content of topics that were tweeted, replied, mentioned or retweeted by Twitter users about food poverty over a specified time period, the first UK national lockdown, at the beginning of the COVID-19 pandemic. We used SNA in our study as it includes a set of techniques that helps to study the structure of large and complex networks by means of community detection and network visualisation (Tunali & Bilgin, 2014). In our data, individuals’ tweets overwhelmingly contained views about the rise of hunger, food poverty and food insecurity due to the response to the COVID-19 pandemic in March 2020. Twitter users perceived that when the pandemic began, many food-secure families were pushed into food insecurity due to rapid rise in unemployment and rising poverty due to quarantine and stay-at-home instructions. They also addressed the sharp rise in food poverty that was driven by panic buying, food shortages, food affordability, disruptions in food supply and food systems. Recent studies have also reported similar results to the above theme that we obtained. According to UK research conducted by the Food Foundation in April 2020, there was a sharp rise in food poverty with more than 3 million people in Britain going hungry because of the COVID-19 pandemic (Staton & Evans, 2020). The survey of 4343 adults indicated that this rise was being driven by self-isolation and stark drops in income that
left many workers unemployed, furloughed or dependent on government support. Based on the survey, 3% of respondents, the equivalent of 1.5 million people, had gone a whole day without eating because of the COVID-19 crisis (Staton & Evans, 2020). It was also reported that food insecurity in the US dramatically increased at the beginning of the pandemic. Loss of income amongst low-income American adults left 44% of these groups at high risk of food insecurity and 20% of them experienced marginal food security (Wolfson & Leung, 2020). In our analysis, it was mentioned by Twitter users that school closures during the global COVID-19 pandemic increased food insecurity for children, especially for low-income children. Similarly, Dunn et al. (2020) highlighted that COVID-19 increased food insecurity amongst low-income children in the US as a result of interruptions in food programmes, which provide daily food for 35 million children, due to prolonged school closures. In the US, in response to the unexpected challenges that COVID-19-related school closures created for the US Department of Agriculture (USDA) school-based nutrition programmes, Congress provided access to the Pandemic Electronic Benefits Transfer (P-EBT) programme to eligible families (McLoughlin et al., 2020). Other efforts to offset loss of school meals included increase in Supplemental Nutrition Assistance Program (SNAP) emergency benefits, the grocery voucher programmes and access to ‘grab-and-go’ meals scheme for newly unemployed families (Masonbrink & Hurley, 2020). Despite these responses, it is reported that access to enough food among children in poverty remains limited (Masonbrink & Hurley, 2020). In England, in response to fears that children on Free School Meals (FSMs) might go hungry during the COVID-19 lockdown, the children’s food voucher scheme was set up for 1.3 million children who were entitled to FSMs (Burns, 2020). In our analysis, users tweeted about their concern around families experiencing food poverty who were not eligible for this government’s new national voucher scheme for FSMs. This reflected theme must be considered as an important concern, since evidence indicates that even short-term periods of food insecurity can cause long-term physical and psychological harms in school-aged children (Dunn et al., 2020). The UK National Food Strategy reported that around 50% of families with children who live with food insecurity would not qualify for FSMs under the current threshold for defining poverty.

**FIGURE 2** Visualisation of word pairs related to ‘food poverty’ used more than 10 times in Twitter. Figure indicates the overall patterns of word pairs communicated in our network based on each word-pair’s frequency.
(an annual household income of less than £7400 before benefits; Dimbleby, 2020). Children from low-income households were further disadvantaged by nutrition shortages driven by the pandemic (Dunn et al., 2020). This was reflected in a campaign (#FreeSchoolMeals) launched by UK Footballer and Campaigner Marcus Rashford, who has been leading a Child Food Poverty Task Force to call for government to support vulnerable children. In a petition, he also called on members of the public to pledge support to #EndChildFoodPoverty. This was echoed by a coalition of health experts, charities and food campaigners who called on the UK’s Secretary of State for Education to extend free school meals during the autumn half-term and Christmas holiday periods by proposing a top-up grant (Sustain, 2020). More recently, the National Food Strategy also recommended the expansion of eligibility for FSMs to all those families with children who are at risk of food insecurity (Dimbleby, 2021).

Throughout our analysis, we found general tweets, many of them asking for donations to provide food and support to those who face food poverty because of the pandemic. A substantial number of these tweets highlighted the rise in foodbank demand while a decrease in donations by people as the result of panic buying, stockpiling and a rapid change in the population’s shopping habits (including a move to online shopping) as they stayed at home. The Independent Food Aid Network (IFAN), which works with more than 250 foodbanks all over the UK, reported an increase demand of 300% for foodbanks in some areas while they experienced a dramatic drop in food donations as people were stockpiling for themselves (BBC, 2020; Coffey, 2020). Rationing of tinned foods, which foodbanks usually rely on, by supermarkets were also reported as the cause of drop in food donations and concern for foodbanks to being able to access adequate food (Coffey, 2020). In the US, foodbanks were similarly reported to struggle to meet overwhelming demands as the pandemic grew and unemployment surged (Nature Plants Editorial, 2020). A further difficulty for foodbanks, other than adequacy of supplies, has been reported to be related to an immediate drop in the number of volunteers due to ‘shielding’ of vulnerable volunteers (Caplan, 2020). All these reflected themes and difficulties with the foodbank system might highlight the fragility of this voluntary food aid sector, which cannot possibly deal with a crisis like COVID-19 pandemic. This fact has been also reflected in a recent letter from academics who called on the UK’s Prime Minister to protect vulnerable and low-income people by initiating a health-based food rationing scheme as well as amending the Agriculture Bill to ensure everyone has access to food (Lang et al., 2020). Our analysis suggested that Twitter users discussed the failure of food systems caused by coronavirus that allowed large quantities of food to be wasted while foodbank demand soared. For instance, they addressed the food waste, especially in the dairy industry where it was reported that thousands of gallons of fresh milk (equivalent to 5% of the US’ milk supply).
were dumped as farmers could no longer sell them to their major consumers like closed public schools and coffee shops (Yaffe-Bellany & Corkery, 2020). It was reported that these stricken farmers donated part of their surplus to foodbanks but limited numbers of refrigerators and volunteers available for food charities made it impossible for so much perishable food to be donated (Yaffe-Bellany & Corkery, 2020). Other factors that made it impossible include the costs of harvesting, processing, transporting and packaging in the current industrial system (Nature Plants Editorial, 2020; Yaffe-Bellany & Corkery, 2020). Twitter users in our study also conversed in their tweets about the impacts of the COVID-19 pandemic on the supply chain disruptions of food that resulted in increased food costs. They addressed the importance of critical measures that are needed to protect people against high food price inflation and poverty triggered by the pandemic-related restrictions. Similar to this reflected theme, the Special Envoy for the 2021 Food Systems Summit also warned about the risk of increasing food prices and a repeat of the 2007/2008 food price spike due to global trade and travel restrictions by governments during the pandemic (Farand, 2020). In another theme emerging from tweets, it was said that co-morbidities, like obesity, are driven by food poverty. These co-morbidities have significant health consequences. In their tweets, users mentioned obesity as a result of poverty and eating of cheap unhealthy foods. They referred to obesity as an important factor to explain why the death toll from COVID-19 was higher in some areas compared to others. Based on the evidence, food poverty and food insecurity contribute to both malnutrition and obesity as poorer families can only afford food that is poor quality, energy dense and low in nutrients (Thompson et al., 2018). Recent studies reported that people living with obesity and diabetes have been found to be more likely to die from COVID-19 (Bower, 2020; Sattar et al., 2020). While hunger is increasing in many countries, it is estimated that 2 billion people are either overweight or obese and 30% of all deaths are linked to nutrition-related diseases (Farand, 2020). The recent UK National Food Strategy has also called for urgent action to tackle both the significant rise in obesity prevalence, especially in the most deprived
communities in England, as well as high levels of food insecurity (Dimbleby, 2021). An important and predominant theme that emerged from analysis of tweets in our data was related to calls on governments to introduce emergency food plans that could end coronavirus food poverty, affecting millions of people. Users, in their tweets, referred to the right to food as one of the most basic human rights.

All the above-mentioned themes were similar for tweets posted by those in the UK and US. Tweets posted by those in the UK also focused on a different theme related to Universal Credit (UC)—a payment to help with living costs in the UK (https://www.gov.uk/universal-credit). In our analysis, users addressed UC, in their tweets, as an element that has caused an increase in poverty and food poverty. The content of their tweets revealed that the implementation of this welfare reform had led to increases in problems such as leaving more people homeless and in poverty, having to use foodbanks and household debt. This theme was mostly related to the data we obtained towards the end of May 2020 (22–23 May) and also addressed delays in UC payments as one of the underlying causes of the rise in food poverty during the pandemic as new UC claimants had to wait for 5 weeks before getting their first payment. In their tweets, users asked the UK government to end this 5-week wait for the initial UC payments as claimants needed this vital support during the pandemic crisis. Studies, however, indicated this social safety net had a number of features that could increase the risk of economic hardship, and in turn, rises in food bank usage even before COVID-19 had begun (Reeves & Loopstra, 2020). Before the COVID-19 crisis, research led by Cheetham et al. (2019) found that UC claimants were being forced into debt, rent arrears, fuel and food poverty with serious negative impact on their health and wellbeing. Additionally, earlier work by Eskandari et al. (2019) found that Twitter users addressed welfare reforms and UC as the cause of the growing numbers of foodbanks in the UK in their conversations. A recent UK study used official statistics on the introduction of UC with data on foodbank usage from Trussell Trust (the UK’s largest foodbank network), to explore the association between the rollout of UC and rising foodbank usage (Reeves & Loopstra, 2020). The study found that the rollout of UC was associated with the
rise in foodbank usage as a critical indicator of financial hardship and food poverty. It also found that moving to the digital version of UC that happened from April 2016 has increased the proportion of people receiving food parcels from Trussell Trust foodbanks as the service may exclude those who lack IT skills and makes the claims submission process harder for some (Reeves & Loopstra, 2020). In terms of delays in receiving UC payment, a qualitative study explored the key factors that influence food choice and eating behaviour of individuals who experienced food poverty in the North West of England (Puddephatt et al., 2020). The study found that participants reported frequent delays in receiving the payment as the main reason for their reduced ability to afford food and for attending foodbanks.

Our study rapidly collected discussions occurring on Twitter during the beginning of the COVID-19 pandemic and the subsequent national lockdown. There are some limitations to consider. We could not identify whether individuals involved in this community network were those with lived experience of food poverty as Twitter does not provide demographic information about the users. Users of social media platforms such as Twitter may not be representative of the community members’ diversity (Roberts et al., 2018) and not all individuals experiencing food poverty have access to, or engage in, smart technologies or social network platforms. Based on 2017 Ofcom figures, only 47% of those on low-income individuals use broadband internet at home (United Nations Human Rights, 2018). A further limitation of our study is that without acquiring informed consent, we did not identify individual Twitter users, unless they were public figures, corporations or charities. This means we did not identify the most influential Twitter users in the formation of such conversations and topics regarding food poverty during this pandemic. Communication theories were not used, as the aim of this study was not to explain the reasons and motives that led Twitter users to communicate via this platform as a particular source of information related to food poverty. We acknowledge that a more detailed discussion about the extent to which the COVID-19 infodemic and related misinformation being spread on Twitter impacted the discussion of the topic of food poverty would be desirable, but it was beyond the scope of the aims and objectives of the current research. Therefore, our results and interpretations, especially with respect to the extent to which they are evidence of an actual increase in food insecurity, should be considered in the context of the spread of misinformation and false narratives related to the COVID-19 pandemic via social media platforms like Twitter which has been significantly increased by the global spread of coronavirus (Yang et al., 2021). In addition, although the use of the #FoodPoverty hashtag offered some reassurance that our collected Twitter data was restricted to the topic of food poverty, it should be considered that using hashtags might bias Twitter data sets. This is because those who use hashtags in their tweets are usually familiar with Twitter and might have a particular interest in the related topics. This means that the conversations investigated in this study might reflect views and opinions of a specific group of Twitter users interested in the topic of food poverty rather than Twitter users as a whole. These limitations highlight the need and potential for future studies to investigate the characteristics of Twitter users tweeting and creating such conversations and discussions around the issue of food poverty. To this end, health-related communication theories such as ‘Uses and Gratification (U&G)’ and ‘Media System Dependency (MSD)’ theories could be used to explain both the goals motivating Twitter users to use such social media platform and the influence of this use on health behaviour on different levels (Dennis Rosenberg & Mesch, 2017).

We fully acknowledge and respect that other countries are represented on Twitter in regard to the topic of this study and it is not our intention to underrepresent them; however, the majority of Tweets appeared to be UK- and US-based. This, we propose, will be as a result of the sampling Twitter provides and that not all tweets are accessible in the free API search parameters. We feel that it is important to keep looking more broadly for increased diversity with regards to this issue.

CONCLUSION

The social and economic upheaval caused by the coronavirus pandemic has been a serious public health issue globally. The present study has contributed to a better understanding of conversations that occurred about food poverty on the social media platform Twitter during the COVID-19 crisis. These findings highlight the conversations and offer suggestions of how to best inform and address future policy changes to improve the food security status especially for the most at-risk individuals. At the time of writing, when new variants of this virus threaten the current vaccination programme and it is probable that future restrictions may occur, this study identifies lessons to learn, by exposing vulnerabilities in the system and capturing the struggles of populations. Moreover, the methodology provides a framework to gather real time data on a range of crisis management topics. It is concluded that Twitter users in our network perceived that to mitigate food poverty or to prevent a ‘hunger pandemic’, robust and longer term policy responses and economic supports are needed to strengthen the resilience of food systems to future pandemic emergencies. As the COVID-19 pandemic evolves, the early results from Twitter conversations about food poverty documented in this study are likely to continue. Future research could continue to conduct a follow-up analysis of Twitter data on this topic, although, the identified limitations of this type of analysis should also be considered.
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