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1 **Food insecurity, poor dietary intake and a lack of free meal uptake among 16-17-year-**
2 **old college students in the North East of England, UK**

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31 **Abstract**

32 *Objective*

33 Food insecurity in the UK has been described as a public health emergency. Although
34 programmes exist to alleviate food insecurity for children and families, there is a lack of
35 focus on 16-17-year-olds across research, policy and practice. The current study set out to
36 address this gap by investigating the food insecurity status and food intake of 16-17-year-olds
37 relative to current nutritional guidelines.

38 *Design*

39 An online, cross-sectional survey design was utilised to collect data on self-reported food
40 security status, food intake and access to and uptake of free college meals. Food intake data
41 were compared to current dietary recommendations on fruit and vegetable intake and high
42 fat/salt/sugar foods; food intake was compared between food secure and food insecure young
43 people.

44 *Setting*

45 Two sixth form colleges based in the North East of England, UK.

46 *Participants*

47 Eighty-three sixth form college students aged 16-17 years.

48 *Results*

49 A minority of young people consumed enough fruit and vegetables to meet or exceed current
50 5-a-day dietary recommendations, but the majority of young people consumed two or more
51 high fat/salt/sugar items, consumption of which was higher in food insecure young people.
52 Additionally, despite almost half the current sample identifying as food insecure, only four
53 young people reported being entitled to free college meals.

54 *Conclusions*

55 The current study was the first to identify food insecurity and poor food intake specifically
56 amongst 16-17-year-olds in England. A lack of uptake of free college meals shows that
57 current policy is not sufficient to address food insecurity amongst this group.

58 **Word Count: 7383**

59 **Key Words:** Food insecurity; Adolescents; School food; Children's rights

60 **Introduction**

61 According to the United Nations Convention on the Rights of the Child (UNCRC, 1989),
62 childhood is a protected time lasting until the age of 18 years. The Convention sets out 54
63 articles outlining the rights of all children including rights to adequate nutrition, shelter and
64 clothing. The UK signed up to this Convention in 1992, but with approximately 30% of
65 children in the UK living in poverty (Royal College of Paediatrics and Child Health, 2020), it
66 is likely that the basic rights of many children are going unfulfilled. Furthermore, the UK is
67 currently impacted by the COVID-19 global pandemic, which is expected to lead to a
68 substantial increase in poverty across the UK (Sumner, Hoy & Ortiz-Juarez, 2020).

69 *Food Insecurity*

70 Poverty is a complex and pervasive experience typically characterised by a lack of resources
71 needed to maintain a standard of living equivalent to the norms of the society in which a
72 person lives (Gordon, 2006). When household finances are strained, food becomes a flexible
73 resource with the quality and quantity available being dependent on what can be afforded
74 once other, more pressing, financial commitments are met (Kennedy, 2014). When
75 'individuals and households do not have regular access to a supply of healthy and nutritious
76 food to meet their dietary needs' (Long et al., 2020, p.1) they are considered food insecure.

77 Globally, it is estimated that 2 billion people have insufficient access to safe, nutritious food
78 (United Nations, n.d.). Yet global food security targets (e.g. Sustainable Development Goal
79 2) tend to focus on addressing the extremes of food insecurity by reducing malnutrition and
80 eliminating hunger. Such issues are more pronounced in Asia and Africa where challenges of
81 globalisation, conflict and drought make food insecurity difficult to address, especially for
82 international organisations attempting to work across multiple countries (United Nations, n.d.
83 Schroeder & Smaldone, 2015). In contrast, more developed countries such as the US, UK,
84 Australia and Canada are argued to possess more power to affect change to address food
85 insecurity through the implementation of independent, country specific policies (Schroeder &
86 Smaldone, 2015). However, food insecurity has been called 'a serious public health concern
87 in rich countries with developed economies' (Pollard & Booth, 2019, p.1) and a 'public
88 health emergency' in the UK due to UK food insecurity levels reported to be amongst the
89 worst in Europe (Furey, 2019).

90 It was recently reported that 12% of children in the UK live in households experiencing food
91 insecurity (The Food Foundation, 2022); an issue which has been greatly exacerbated by the
92 COVID-19 pandemic (Loopstra, 2020; Power et al., 2020). This is concerning as inadequate
93 nutrition throughout childhood can be detrimental to growth and development and can lead to
94 poorer health outcomes into adulthood (Perkins et al., 2017; Schwarzenberg & Geogieff,
95 2018). UK-based research has shown that under such circumstances, families adopt various
96 strategies such as relying on cheaper, less nutritious foods and parental meal skipping to
97 make available food go further and to try to reduce the possibility that children in the
98 household will experience hunger (Defeyter et al., 2015). However, food insecurity exists on
99 a scale with experiences of hunger associated with severe food insecurity (Food and
100 Agriculture Organization of the United Nations, 2022). While no universal definition of food
101 security is applied consistently across research and policy, most capture its multifaceted
102 nature that extends beyond the alleviation of hunger alone. It has been argued that an
103 abundance of food is not enough to ensure food security, but food should also be safe,
104 nutritious and accessible in a socially acceptable manner (Schroeder & Smaldone, 2015).

105 *Importance of a Nutritious Diet*

106 Current recommendations advise that from the age of five years, children should consume a
107 diet consistent with the Eatwell Guide, including consumption of at least five portions of fruit
108 and vegetables per day and minimal consumption of high fat, salt and sugar foods (Public
109 Health England, 2016).

110 It is recommended that fruit and vegetables make up over a third of an individual's daily food
111 consumption, and a mixture of fruit and vegetable items should be consumed to ensure intake
112 of a variety of vitamins and minerals. This is important as fruit and vegetables have been
113 associated with more favourable health outcomes and reduced risk of chronic diseases such
114 as coronary heart disease and stroke (Angelino et al., 2019).

115 Despite wide publication of the 5-a-day message through programmes such as Change for
116 Life (n.d.), national survey data consistently shows that many of the UK population do not
117 meet current recommendations for fruit and vegetable intake. The National Diet and Nutrition
118 Survey (NDNS) showed over a period between 2014 to 2016 that only 8% of 11-18-year-olds
119 and 31% of adults met the recommendation for consuming 5 portions of fruit and vegetables
120 per day. Indeed, in a 2020 update, dietary recalls indicated that fruit and vegetable intake

121 continued to fall below current recommendations with mean consumption at 2.8 and 3.7
122 portions per day for these groups respectively (Ashford et al., 2021).

123 Analysis of NDNS data on fat, salt and sugar intake showed a similar trend, going against
124 current recommendations. Whilst intake of free sugars amongst children had decreased over
125 time, mean free sugar intake still exceeded current recommendations across all age groups.
126 Similarly, mean intakes of saturated fat amongst all age groups and salt amongst adults also
127 exceeded current recommendations (Bates et al., 2019; 2020). Such statistics are concerning
128 as excess intakes of fat, salt and sugar are associated with detrimental health outcomes,
129 including overweight and obesity, tooth decay, and hypertension (Belc et al., 2019; Grimes et
130 al., 2013; Jones, 2016).

131 Across England, 9.7% of children in reception (aged 4-5 years) and 20.2% of children in year
132 6 (aged 10-11 years) are reported to be obese (NHS, 2019) and the situation does not appear
133 to improve with age as 63% of adults are also reported to be overweight or obese
134 (Department of Health & Social Care, 2020). Against the current backdrop of the ongoing
135 COVID-19 pandemic, this is problematic as obesity has been linked to greater risk of severe
136 complications and death amongst COVID-19 patients (Public Health England, 2020). This is
137 in addition to a range of health issues that have previously been associated with obesity
138 including type 2 diabetes, coronary heart disease and stroke (Al-Goblan, Al-Alfi & Khan,
139 2014; Mitchell et al., 2015; Lassale et al., 2018).

140 To add further to the complexity of this situation, determining levels of overweight and
141 obesity in adolescents specifically is difficult as there are differences in the way adolescents
142 are classified by age. The World Health Organisation, for example, define 'Adolescents' as
143 individuals in the 10-19 years age group, while 'Young People' are in the age range 10-24
144 years (WHO, 2020). On the other hand, The Health Survey for England 2019 (NHS, 2020)
145 categorises children over the age of 16 as adults. This contradicts the UNCRC (1989)
146 definition of childhood, which lasts up to the age of 18 years, and brings into question
147 whether children's health and wellbeing can be properly supported up to the age of 18 years
148 with such inconsistencies in age categories.

149 *Obesity and Food Insecurity*

150 Whilst obesity has typically been associated with excess energy intake (Romieu et al., 2017),
151 research has established a link between obesity and food insecurity (Brown et al., 2019;
152 Mohammed et al., 2016). This relationship is often described as paradoxical because food

153 insecurity is generally associated with a lack of food rather than eating to excess (Nettle,
154 Andrews & Bateson, 2017). However, it has been argued that perceived threats to food
155 availability can lead individuals to overeat when food is available and to store more fat in
156 response to the perceived threat; this is particularly the case for females (Dhurandhar, 2016;
157 Nettle et al., 2017).

158 Furthermore, it has been reported that high calorie, energy dense foods of lower nutritional
159 value are often perceived as more accessible than healthier options to caregivers in low-
160 income households, which has negative implications for health and the development of food
161 preferences (Daniel, 2020). Yet, this is somewhat controversial as findings from studies
162 investigating food insecurity and dietary quality are mixed. For example, in a recent UK-
163 based study, no differences in energy intake were found between food secure and food
164 insecure adults. However, food insecure individuals did have less diverse intake of foods
165 (Shinwell et al., 2021). On the contrary, some studies have reported lower dietary quality
166 amongst food insecure groups, particularly in terms of fruit and vegetable intake, though it is
167 argued that poorer dietary quality might be less prominent amongst food insecure children
168 due to strategies adopted by their caregivers to ensure their dietary intake is less impacted
169 (Hanson & Connor, 2014).

170 *School and Community Food Provision*

171 In an effort to support children and young people in England to access nutritious food, all
172 primary and secondary schools must provide pupils with a nutritious lunch each day during
173 school term time. For children and young people of families on low income, lunches can be
174 accessed free of charge (Department for Education, 2019). For young people aged 16-19
175 years enrolled on further education courses, free meals can also be obtained through their
176 educational establishment. However, as well as being means tested, student eligibility for free
177 meals at post-16 establishments is also based on time spent on site, so if a student attends
178 their educational setting for only part of the day (e.g. 9am-10am), the setting does not have to
179 provide a meal on that day. Additionally, there is more flexibility in where free food can be
180 accessed with students able to use vouchers off-site in local food outlets (Education and
181 Skills Funding Agency, 2020).

182 Recognising the importance of children and young people having sufficient access to
183 nutritious food, current Government policy stipulates that schools, colleges and further
184 education settings should actively support children and young people to make healthy food

185 choices (Department for Education, 2019; Education & Skills Agency, 2020). While evidence
186 on the effectiveness of school lunches in improving access to and intake of healthier foods is
187 mixed (Lucas et al., 2017; Micha et al., 2018), free school meals have been described as ‘a
188 key public health policy in reducing food insecurity and dietary inequalities in children in the
189 UK’ (Parnham et al., 2020, p.2). Furthermore, the school dining experience can provide
190 additional benefits to children and young people such as opportunities to practice social skills
191 and learn cultural rules, which are important experiences for positive social development and
192 wellbeing (Earl & Lalli, 2020). These experiences could be particularly beneficial for
193 children and young people from food insecure households as research has shown that food
194 insecurity can be associated with social isolation and less mealtime structure (McKenzie &
195 Watts, 2020; Schuler et al., 2020).

196 Building on free lunch provision in educational settings, many school and community
197 organisations also provide food to children and their families through other means, including
198 breakfast clubs and holiday clubs (Lambie-Mumford & Sims, 2018). Such schemes have
199 been implemented in response to concerns that many families are experiencing food
200 insecurity (Holley & Mason, 2019; Mann et al., 2018). However, a large proportion of these
201 schemes are targeted towards and accessed by families with children of primary school age
202 (Mann, Widdison & Defeyter, 2020). As children and young people progress through the
203 education system, the availability and uptake of formal, policy driven food provision appears
204 to diminish. For example, Beattie and Gilmore (2016) reported that with increasing age,
205 children are less likely to take up the offer of school lunch. Similarly, a recent report on the
206 National School Breakfast Programme (NSBP, 2019), which supports the provision of free
207 breakfast in schools “in the most disadvantaged areas of England” (p.5), showed that the
208 scheme was available in 1384 primary schools compared with only 332 secondary schools.

209 At the current time, there are no widely available statistics on the provision and uptake of
210 food for young people in post-16 educational settings. This is surprising given that uptake of
211 free lunches in primary and secondary schools is reported annually through the School
212 Census (for a recent example, see National Statistics, 2021). Additionally, some data exist on
213 breakfast and holiday club provision for children and young people (e.g. Mann et al., 2018;
214 NSBP, 2019), though such data are not as routinely reported as they are for school lunch.

215 Moreover, the UNCRC, which outlines children’s rights up to the age of 18 years, stipulates
216 that children and young people have a right to adequate nutrition. However, no published

217 studies have considered the food intake and food security status of young people aged 16-17
218 years in post-16 educational settings to identify whether there is a need for closer scrutiny of
219 available food provision at this age. According to Zace et al. (2020), there is a need for
220 further research to identify and address food insecurity across different age groups to
221 investigate how and why different groups are affected.

222 *Current Study*

223 Given the need for more research on food insecurity across different age groups (Zace et al.,
224 2020) and a lack of focus on 16-17-year-olds in food research, policy and practice, the
225 current study set out to address this gap. The aim of the study was to investigate for the first
226 time: a) the prevalence of food insecurity amongst a sample of 16–17-year-old sixth form
227 college students b) food intake of 16–17-year-old college students relative to current
228 nutritional guidelines c) whether there are differences between food secure and food insecure
229 sixth form college students in terms of their food intake.

230 **Method**

231 *Participants*

232 An opportunity sample of 90 students from two sixth form colleges based in the North East of
233 England participated in the current study. However, data from seven students were not
234 included in the final analyses because the students were aged above 18 years and were
235 therefore above the age bracket for which the study materials were designed. The final study
236 sample consisted of 66 females and 17 males aged 16-17 years ($M=17$ years 1 month;
237 $SD=4m$). Most participants (88%) identified as White British and the remainder of
238 participants identified as either British Asian ($n=3$); White European ($n=2$); Filipino ($n=1$);
239 White Arab ($n=1$); and White Other ($n=1$). One participant did not disclose their ethnicity.

240 *Materials*

241 Data were collected through an anonymous online questionnaire, which was delivered via the
242 Qualtrics platform (www.qualtrics.com). Participants were not required to include any
243 identifying information, but were asked to provide a memorable word, which could be used
244 to withdraw data if requested by the participant at a later date.

245 Food intake was measured using a food frequency questionnaire, which was developed in
246 consultation with youth group staff who commented on the suitability of the food lists for the

247 target age group. The measure required participants to tick a box next to foods and drinks
248 consumed on the previous day from given lists. Foods and drinks were listed under the
249 categories: fruits; vegetables; potatoes; cereals; breads; pasta, rice and noodles; meat and fish;
250 eggs; ready meals; puddings & desserts; crisps and confectionery; and drinks. A total of 91
251 food and drink items were presented and participants were also given the option to add any
252 foods or drinks consumed that were not listed.

253 Food security status was measured using the United States Department for Agriculture
254 (USDA) Food Security Survey Module for Youth Ages 12 and Over (2006). The survey
255 consisted of nine questions, which asked young people about food availability, quality and
256 access within their household during the previous month. For each question, participants were
257 asked to select a response of either 'A Lot,' 'Sometimes' or 'Never'. Responses of
258 'Sometimes' and 'A Lot' were summed for each participant and then, based on their score,
259 participants were classified as experiencing either: 1) High Food Security (no affirmative
260 responses); 2) Marginal Food Security (1 affirmative response); 3) Low Food Security (2-5
261 affirmative responses); 4) Very Low Food Security (6-9 affirmative responses).

262 Additionally, participants were asked to provide demographic information (i.e. gender, age
263 and ethnicity), and were asked whether they were entitled to and accessed free college meals.

264 *Procedure*

265 Following ethical approval, details of the study were sent out to colleges based in the North
266 East of England. Two college head teachers subsequently provided consent for their students
267 to participate in the study. Students were then provided with written information about the
268 study and were asked to take information home for their parent/carer (where applicable) to
269 inform them that they would like to take part in the study. Students, parents/carers and
270 college staff were given opportunities to seek clarification about the study if necessary,
271 before students were provided with a link to access the online questionnaire.

272 After clicking the link, students were presented with information reminding them about the
273 aims of the study and what their participation would involve. They were asked to provide
274 consent and a memorable word ensuring their ability to withdraw from the study following
275 their participation whilst maintaining anonymity. Additionally, students were advised that
276 they could withdraw before or during participation by closing their web browser. Students
277 completed the food frequency measure followed by the food security measure and
278 demographic questions. On completion of the questionnaires, students were provided with

279 written debrief information. Students from College 1 completed the questionnaires during
280 April/May 2019 and from College 2 during December 2019. The questionnaire completion
281 dates were decided in accordance with the requirements of the college timetables to avoid
282 busy periods such as exams.

283 **Results**

284 *Food Intake*

285 For each student, the number of reported fruits and vegetables were compared against UK
286 dietary recommendations, which advise consumption of a combination of at least five fruit
287 and vegetables per day (Public Health England, 2016).

288 Of the 83 students included in the final sample, only 28% (n=23) met or exceeded the
289 recommended daily intake of fruits and vegetables. Twenty-nine percent of students (n=24)
290 ate a combination of some fruit and vegetables, but not enough to meet dietary
291 recommendations. Seventeen percent (n=14) consumed fruit but no vegetables and 11%
292 (n=9) consumed vegetables but no fruit, suggesting that the majority of students are
293 managing to incorporate some fruits and vegetables into their diets, but the quantity and
294 variety are not sufficient to meet current dietary recommendations. However, this was not the
295 case for a minority of students as 16% (n=13) reported consuming no fruits or vegetables at
296 all on the reference day.

297 The numbers of reported fast foods, crisps and confectionery, puddings and desserts were
298 also collated to form a high fat/salt/sugar category. Current UK dietary recommendations
299 suggest that these foods should be consumed in moderation as they offer little, if any,
300 nutritional benefit (Public Health England, 2016). Eighty-seven percent (n=72) of students in
301 the current study reported consumption of at least one high fat/salt/sugar food but the
302 majority of students consumed two or more (see Table 1).

303

304 **Table 1: Number of students consuming high fat/salt/sugar foods (HFSS)**

Number of HFSS foods reported	Number of students reporting consumption (%)
0	11 (13%)
1	19 (23%)

2	24 (29%)
3	16 (19%)
4	7 (8%)
5	5 (6%)
6	1 (1%)

305

306 *Food Security*

307 All participating students (n=83) completed all nine items of the Food Security Survey
 308 Module for Youth Ages 12 and Over (USDA, 2006). Based on their responses, students were
 309 categorised into one of four food security categories in line with USDA (2019) definitions:
 310 (1) high food security; (2) marginal food security; (3) low food security; (4) very low food
 311 security.

312 Overall, 59% of students (n=49) reported experiencing high food security. These students
 313 gave no affirmative questionnaire responses, suggesting that they perceived no issues with
 314 their ability to maintain access to a sufficient source of nutritious food.

315 A further 8% of students (n=7) identified as marginally food secure as they gave affirmative
 316 responses to one questionnaire item. This classification suggested that although they did not
 317 experience consistent changes in their food intake, these students did have some anxiety over
 318 the adequacy of food available within their households.

319 Twenty-eight percent of students reported low food security, which is characterised by a
 320 reduction in quality or variety of food within the household. A further 5% of students (n=4)
 321 experienced very low food security, which is consistent with reduced food quality and intake.

322 Consistent with these categories, responses to individual survey items (see Table 2) revealed
 323 that for most students, experiences of food insecurity tended to be characterised by worries
 324 around food availability and reductions in food quality (i.e. less able to access a balanced
 325 meal). However, a small proportion of students gave affirmative responses to questions on
 326 reduced portion sizes and meal skipping, which demonstrates that some students are
 327 experiencing food insecurity with hunger.

328 **Table 2: Number of affirmative responses to food security survey items**

Questions	Number of Affirmative Responses (%)
Did you worry that the food at home would run out before your family got money to buy more?	23 (28%)
Did the food that your family bought run out, and you didn't have money to get more?	10 (12%)
Did your meals only include a few kinds of cheap foods because your family was running out of money to buy food?	20 (24%)
How often were you not able to eat a balanced meal because your family didn't have enough money?	17 (20%)
Did you have to eat less because your family didn't have enough money to buy food?	13 (16%)
Has the size of your meals been cut because your family didn't have enough money for food?	8 (10%)
Did you have to skip a meal because your family didn't have enough money for food?	6 (7%)
Were you hungry but didn't eat because your family didn't have enough food?	8 (10%)
Did you not eat for a whole day because your family didn't have enough money for food?	2 (2%)

329

330 Finally, data on free college meal entitlement showed that only 5% of students (n=4) reported
331 that they were entitled to access free college meals and only 4% (n=3) reported that they take
332 up these meals. These students were all categorised as food insecure. Eighty-seven percent of
333 students (n=72) reported that they were not entitled to free college meals and 43% (n=31) of
334 these students were categorised as food insecure. Eight percent of students (n=7) did not
335 provide an answer on whether they are entitled to free college meals and no students
336 answered 'Don't know' in response to this question.

337 *Food Security Status and Food Intake*

338 Students were grouped as either food secure (i.e. high food security) or food insecure (i.e.
339 low or very low food security) based on their responses to the Food Security Survey Module.

340 Comparisons were made between groups on the number of reported fruit and vegetables and
341 number of reported HFSS items consumed using Mann-Whitney U tests.

342 Analysis showed no significant difference between groups in the number of fruit and
343 vegetables items consumed ($U=625, p=.401$). However, there was a significant difference
344 between groups in the number of HFSS items reported ($U=476, p=.014$) with the food
345 insecure group (*Mean Rank*=45.63) reporting consumption of more HFSS items than the
346 food secure group (*Mean Rank*=33.32).

347

348 **Discussion:**

349 The current study set out to investigate the food intake and food security status of young
350 people aged 16-17 years. To our knowledge, no previous studies have explored the food
351 intake and food security status of 16–17-year-olds independently of other age groups.
352 However, this distinction is important as it has been recognised that children’s food habits,
353 food security experiences and uptake of food interventions such as free school meals vary
354 across different stages of childhood, therefore it has been suggested that specific age groups
355 should be identified within research studies that seek to understand food habits and food
356 security (Beattie & Gilmore, 2016; Zace et al., 2020). Furthermore, until the age of 18 years,
357 young people are afforded specific rights and protections under the UNCRC (1989),
358 including the right to adequate nutrition. However, as they move on from school to college at
359 the age of 16, young people gain a greater level of independence (Harris, 2019), so
360 consideration of food habits and food security at this age is critical to identifying whether
361 more support is needed during this transitional period.

362 In terms of food intake, results of the current study showed that only a small percentage of
363 young people (28%) consumed enough fruit and vegetables on the reference day to meet or
364 exceed current dietary recommendations. On the contrary, the majority of young people
365 (64%) consumed two or more high fat/salt/sugar items, but consumption was higher amongst
366 young people experiencing food insecurity compared to their food secure peers.

367 These findings lend support to existing data on nutritional intake across the UK, which show
368 that adherence to recommended daily intakes of fruit, vegetables and high fat, salt and sugar
369 foods remains a cause for concern (Bates et al., 2019; 2020). It is widely accepted that fruit
370 and vegetables are an essential part of a nutritious diet whilst consumption of HFSS foods

371 should be kept to a minimum since overconsumption of these foods not only leads to
372 overweight and obesity but can result in cognitive deficits when consumed during
373 adolescence (Reichlet, 2016). Moreover, a variety of health risks including overweight and
374 obesity become apparent during adolescence and carry increased health risks into adulthood
375 (Saydah et al., 2013). Also, poor preconception micro and macronutrient deficiencies can
376 result in serious long term foetal and infant development leading to early childhood mortality
377 and stunting (Mason et al., 2014).

378 Undeniably, food insecurity was also a pertinent issue identified amongst young people aged
379 16-17 years, with almost half the current sample categorised as experiencing either moderate,
380 low or very low food security. Moreover, only four students identified as having entitlement
381 to free college meals, and only three students reported that they accessed these meals,
382 bringing into question the suitability of this support for young people of this age.

383 Although current Government policy stipulates that schools, colleges and further education
384 settings should support children and young people to access healthy foods (Department for
385 Education, 2019; Education & Skills Agency, 2020), it has been argued that current food
386 systems do not successfully facilitate healthy dietary intake amongst children and young
387 people (Hawkes et al., 2020). Barriers to healthy foods, such as cost and availability, were
388 recently identified through the Children's Future Food Inquiry (2018), which sought to draw
389 attention to children's views and experiences of food and food insecurity. The inquiry also
390 highlighted broader issues of stigma, which deterred children from accessing free food.

391 Taken together, the findings of current and previous research suggest that making free food
392 available is not enough to fully ensure that those experiencing food insecurity are supported,
393 and more should be done to ensure children and young people are consulted in the design and
394 implementation of food interventions, to ensure their needs are met. This argument is in line
395 with Hawkes et al. (2020) who proposed that food systems development requires a more
396 child-centred approach that seeks to understand what children are eating and the contextual
397 factors relating to dietary choices and behaviours. They argued that these factors should be
398 incorporated up through the food system to create food environments and systems that align
399 with the contexts in which children live. In support of this, previous research has shown there
400 is value in drawing on the perspectives of key stakeholders involved in food interventions as
401 they understand the facilitators and barriers to access which are prevalent at a local level (e.g.
402 Graham et al., 2016).

403 Paying particular attention to the age group involved in the current study, it is important that
404 further research is conducted to explore the views and experiences of 16-17-year-olds
405 specifically. In a recent Parliamentary debate (UK Parliament, 2020), the issue of funding in
406 post-16 education was raised with some attention drawn to the need for young people to be
407 provided with the funds and facilities to access food whilst attending college. In support of
408 this argument, the current findings showed that food insecurity is an issue that continues
409 beyond formal school years at a time when young people are embarking on greater
410 independence, suggesting that support is needed to ensure their experiences of food insecurity
411 do not continue on into adulthood. Although some support is currently available through free
412 college meals, the current findings showed that uptake of this scheme appears to be low so
413 more work is needed to establish a system that addresses the needs of young people in post-
414 16 education.

415 Future research should also consider the potential added benefits of free college meals that
416 extend beyond nutritional intake. Studies of school dining occasions, including breakfast and
417 lunch, have identified that eating alongside peers and school staff can be a valuable social
418 experience (Earl & Lalli, 2020; Graham, Russo & Defeyter, 2015). However, students in
419 post-16 education have more flexibility in terms of food access and can obtain vouchers to
420 eat off-site in local food outlets (Education & Skills Agency, 2020). While it could be argued
421 this approach provides students with a more socially acceptable means of obtaining free food,
422 there might be scope within colleges to enhance the social occasion around food in an effort
423 to facilitate engagement with free meals. Given that peers are a crucial source of support for
424 young people during adolescence (Wang et al., 2021), the social aspects of college meals are
425 worthy of further exploration.

426 Despite the utility of the current findings, it is important to recognise the limitations of this
427 study. Firstly, the study recruited a sample of participants from two colleges based in the
428 North East of England. More research is needed to investigate whether similar findings are
429 evident in other regions of England with equivalent food policies in place. Furthermore, the
430 current study has provided evidence of food insecurity and poor dietary intake amongst 16-
431 17-year-olds, but it was not possible within the scope of this study to ascertain the reasons
432 behind these issues. Future qualitative investigation would be useful to determine whether
433 young people's dietary intake is driven by choice or whether broader contextual factors such
434 as cost and availability, which were highlighted in the Children's Future Food Inquiry are
435 pervasive amongst 16-17-year-old college students. Moreover, the current findings provide a

436 limited representation of food intake and food insecurity at one time point. The decision was
437 made to ask participants to complete the questionnaire on just one occasion following
438 discussions with college tutors who pointed out that their students are often dealing with
439 multiple competing demands including college work, caring responsibilities and employment,
440 which would limit the time available for research participation. Going forward, more
441 collaborative work is needed with young people to identify suitable methods of data
442 collection to maximise participation amongst this age group while minimising participant
443 burden. Finally, the current study was conducted before the onset of the COVID-19
444 pandemic, which has resulted in more families experiencing food insecurity and changes in
445 the way school food is accessed (Loopstra, 2020; Department for Education, 2021). It would
446 therefore be useful to investigate how 16-17-year-olds have been impacted by the pandemic
447 and changes to the school food system.

448 To conclude, the findings of the current study demonstrated that poor food intake and food
449 insecurity are issues amongst young people aged 16-17 years attending sixth form colleges in
450 the North East of England. Moreover, the uptake of free meals in these colleges is minimal.
451 The findings show there is a need for further research to explore the views and experiences of
452 16-17-year-olds to identify the reasons for food insecurity and poor food intake at this age.
453 Also, more collaborative work is needed across research, policy and practice to ensure that
454 food interventions for older adolescents are developed and implemented in a way that meets
455 the needs of those they aim to support. Finally, given that 16-17-year-olds retain rights as
456 children under the UNCRC (1989), more attention should be paid to the way in which this
457 age group is categorised across research and policy to ensure that they are not simply treated
458 as adults and their rights are upheld. At the same time, it is important that the unique status of
459 16-17-year-olds is also recognised as they embark on a period of independence that sets them
460 apart from younger, school-aged children.

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