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1 **Exploring the influence of local food environments on food behaviours: a systematic review of**
2 **qualitative literature**

3
4 **Introduction**

5
6 The role of the built environment has received growing attention in relation to its contribution to
7 diet and health outcomes such as obesity⁽¹⁾. Food and nutrition environments have been
8 transforming rapidly over the past few decades⁽²⁾, with many changes in access and availability of
9 foods in line with shifting patterns of dietary intake⁽³⁾ and social demographics⁽⁴⁾. Decreased
10 availability of and accessibility to supermarkets has been identified as a key barrier to consuming a
11 healthy diet⁽⁵⁾ and a number of studies have reported on healthier food options being more
12 expensive than less healthy foods⁽⁶⁾. In environments that are seemingly less supportive of healthy
13 eating, it is often difficult to make nutritious food choices when reduced availability, accessibility
14 and affordability challenge the ability to acquire healthier alternatives⁽⁷⁾.

15
16 The local food environment has usually been categorised and measured in terms of different types
17 of food outlets including the supermarkets, corner stores, fast food outlets and restaurants available
18 to individuals where they live⁽⁸⁾. Based on this work, Glanz and colleagues⁽⁹⁾ have developed a
19 conceptual framework that identifies three types of environments including the community nutrition
20 environment (types of stores, accessibility), the consumer (within-store) nutrition environment
21 (availability of healthy options, price, nutrition information) and organisational nutrition
22 environment (home, school or work). These environments are influenced by a combination of
23 government and industry policies and the information environment (media and advertising), which
24 work in combination with individual factors such as socio-demographics, psychosocial factors and
25 the perceived nutrition environment, and ultimately help determine eating patterns and behaviour⁽⁹⁾.

26
27 Much of the existing quantitative literature has sought to establish a relationship between the food
28 environment (particularly the community nutrition environment) and both dietary behaviours and/or
29 weight status^(7; 10). However results have been inconsistent and the role of the food environment on
30 eating patterns is far from understood⁽⁹⁾. Whilst most evidence on the links between the food
31 environment and dietary intake comes from quantitative studies, as demonstrated by a series of
32 systematic reviews^(7; 9; 10; 11; 12; 13), far less research has been undertaken in terms of understanding
33 the food environment from a qualitative perspective.

35 There is no currently published systematic review of qualitative literature that has specifically
36 looked at the local food environment and dietary behaviours. Much of the qualitative research has
37 explored socio-ecological determinants of food choices and/or dietary behaviours of different
38 population groups (children^(8; 14), adolescents^(15; 16) and socio-economically disadvantaged
39 populations^(17; 18)) in a range of environments (home^(8; 16), school^(19; 20) or local community^(13; 21)).
40 Although one qualitative systematic review has explored obesogenic dietary intake in young
41 children⁽²²⁾ and another has focused on determinants of fruit and vegetable consumption in children
42 and adolescents⁽²³⁾, neither solely considered environmental determinants or food and purchasing
43 behaviours.

44

45 Given the difficulty of studies and systematic reviews of quantitative literature in establishing
46 associations between objective measures of the food environment and dietary behaviours or health
47 outcomes such as obesity, this review aims to investigate what the qualitative literature tell us about
48 the influence of the local food environment on food and purchasing behaviours. Synthesising
49 qualitative evidence will enable an in-depth exploration of food environments to provide greater
50 understanding of possible explanations for contrary outcomes and assist to inform and generate new
51 hypotheses in quantitative research and subsequently guide the design of public health policy,
52 interventions and practice⁽²⁴⁾.

53

54 **Methods**

55

56 This review adheres to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses
57 (PRISMA) statement to ensure quality of methods and reporting⁽²⁵⁾ and the PRISMA checklist is
58 included as Supplementary Table A.

59

60 **Search methods**

61 Six electronic databases were searched using keyword searches of entire articles. The databases
62 included Medline, Health Reference Centre, CINAHL Plus with full text, PsycINFO, PubMed and
63 Australian and New Zealand Reference Centre. Terms were selected to define essential elements of
64 the search including the environment and specifically the type of environment, food and dietary
65 intake, qualitative research methods, as well as key food environment concepts. The list of search
66 terms and lateral searching methods are provided in Supplementary Material.

67

68 **Eligibility criteria**

69 Articles were included if they incorporated a qualitative research method with the inclusion of
70 participant comments or quotes; were a primary study published in a peer-reviewed academic
71 journal between 2000 and 2015; and were written in English language. The inclusion of the 15-year
72 time period was selected given the increasing contribution to the food environment literature during
73 this time^(13; 26).

74

75 The current review was particularly interested in explicit references made to people's food
76 consumption and/or purchasing behaviours or related environmental determinants as a function of
77 the local food environment, as supported by specific quotes from participants. Research focusing on
78 dietary intake of specific micro- or macronutrients or particular health or nutrition
79 conditions/disorders, as well as studies on dietary acculturation or food security outside the context
80 of food environments and purchasing behaviours, were excluded.

81

82 Some criteria were further refined such as excluding articles based on their setting, specifically
83 schools, workplaces and within-home environments **due to the additional scope and diversity**
84 **afforded by these other types of food environments**. Additional eligibility criteria were defined
85 during the study selection process including the decision to include articles sampling adults and/or
86 children within urban/metropolitan areas, but only if reported from the perspective of an adult, as
87 the primary purchaser of food. **Rural localities, as defined by the paper in their original context,**
88 **were excluded given the potential differences in food environments between rural and urban areas.**

89

90 **Study selection**

91 Articles identified through database searches were imported into EndNote Version X7. Duplicate
92 records, non-English language articles and non-journal articles were removed. One author (E.P.)
93 reviewed titles, abstracts and identified articles required for full text evaluation. Inclusion or
94 exclusion of full text articles was undertaken independently by three authors (E.P., D.G. & L.T.)
95 and then determined by majority consensus upon group discussion. Additional articles were
96 retrieved from reference lists of included articles. **The PRISMA flow diagram is recommended to**
97 **document the systematic review search and selection process⁽²⁷⁾ and its application to the current**
98 **review can be seen in Figure 1.**

99

100 **Quality assessment**

101 **Although there is currently a lack of consensus regarding the best tool for undertaking quality**
102 **assessment of qualitative research⁽²⁸⁾, the Critical Appraisal Skills Programme (CASP) tool for**

103 appraising qualitative research is one recognised appraisal tool and was subsequently used to
104 undertake quality assessment of included studies for this review⁽²⁹⁾. The purpose of the quality
105 assessment was not to exclude articles based on their quality but simply to assess their rigor,
106 credibility and relevance⁽³⁰⁾. This assisted in gaining a depth of understanding of the articles
107 included⁽³¹⁾, particularly in terms of their strengths, weaknesses and overall contribution to the
108 review⁽³²⁾.

109

110 **Data extraction and analysis**

111 Summary data of eligible studies were extracted including authors and year of publication; study
112 location; study aim; sample characteristics and data collection methods.

113

114 Data analysis utilised the thematic synthesis process as detailed by Thomas and Harden⁽³³⁾ which is
115 a widely utilised approach to analysing and synthesising qualitative data within systematic
116 reviews⁽³¹⁾. The three main stages of this method included inductive line-by-line coding of article
117 findings; developing descriptive codes to translate concepts between studies and finally; developing
118 analytic codes to transform findings beyond the context of the original studies to generate new
119 meaning and understanding. All major sections of empirical findings focusing on the local food
120 environment and food/purchasing behaviours or related environmental determinants were free
121 coded (E.P.) for four articles and then cross checked (D.G.) for quality assurance and consensus.
122 The remaining articles were subsequently coded in the same manner.

123

124 Descriptive themes were developed by grouping individual codes by topic or similar ideas. Codes
125 were then reorganised into a hierarchal structure under themes, allowing individual codes to sit
126 under multiple descriptive themes or left in free code form. Descriptive themes and codes were
127 iteratively reorganised and refined with similar or overlapping codes and themes being merged
128 together. All authors participated in ongoing critical discussion regarding refinement of codes and
129 themes.

130

131 Analytic themes emerged through an iterative inductive and deductive approach. Firstly, the
132 relationships between descriptive themes were examined and then applied to answer the review
133 question. The latter evolved by conceptualising the relationship between the food environment and
134 dietary intake, as presented through initial coding and generation of descriptive themes. Similarities
135 emerged with Glanz and colleague's model of Nutrition Environments⁽⁹⁾ and thus their framework
136 was used deductively to structure the findings in the context of existing literature and current

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137 understanding of food environments. Final descriptive themes and codes became mutually
138 exclusive under analytic themes.

139

140 **Results**

141

142 **Summary of included studies**

143 A total of 2,744 articles were identified through the search process, of which 30 met the inclusion
144 criteria for this review (Figure 1). Included studies were published between 2001 and 2015 with 19
145 from the United States, seven from the United Kingdom and one each from Mexico, Canada,
146 Australia and the Netherlands. Data collection methods included focus groups (n=14), interviews
147 (n=12) and a combination of interviews and focus groups (n=4). Sixteen articles sampled
148 participants specifically for characteristics of socio-economic position and seventeen articles
149 sampled participants either solely or predominantly from ethnically diverse communities, 13 of
150 which consisted of African American populations. A summary of the included studies can be seen
151 in Table 1.

152

153 **Quality assessment**

154 The outcomes from the quality assessment are presented in the supplementary Table C. Only 4 of
155 the 30 articles met the criteria for all domains of quality. All articles provided a clear statement of
156 aims, qualitative methodology and research design, however, two lacked key details regarding their
157 recruitment strategy, five did not provide information on ethical clearance and 12 did not consider
158 the relationship between researchers and participants during research design or data collection.
159 There was no mention or detail provided regarding data saturation as part of data analysis in 23 of
160 the articles, seven did not consider implications of bias either during analysis or reporting and two
161 articles failed to discuss the credibility of their research findings. Finally, three articles did not
162 consider applicability or transferability of the research

163

164 **Key findings**

165 Thematic synthesis results are presented under four key analytic themes including the community
166 nutrition environment, the consumer nutrition environment, other environmental factors and
167 individual coping strategies for shopping and purchasing decisions. A matrix of key themes
168 identified across the included studies can be seen in Table 2. **The analytic themes represent a blend
169 of concepts that either directly or partially align with Glanz and colleague's model of Nutrition
170 Environments⁽⁹⁾ and provide a means of understanding the findings in terms of current food**

171 environment literature*. However, the themes also highlight other novel and emergent ideas. For
172 example, behaviours such as coping strategies are not represented within this particular framework.

173

174 **COMMUNITY NUTRITION ENVIRONMENT**

175

176 **Availability**

177 The comparative availability of healthy and unhealthy options in the food environment was
178 identified as playing a key role in food purchasing decisions and was discussed by 16 articles in the
179 review from predominantly lower income or minority populations in the Netherlands, Australia,
180 United States and United Kingdom. Articles mentioned the proliferation of take away foods within
181 communities^(17; 34) and decreased or declining availability of produce, which was seen as one of the
182 biggest influences on diet⁽³⁵⁾. Concern was raised regarding the availability of convenience or junk
183 foods within stores⁽³⁴⁾, the proximity to fast food and thus the subsequent increased consumption of
184 these foods^(36; 37; 38; 39) and decreased consumption of fresh produce⁽⁴⁰⁾.

185

186 *“every corner sells fast food ... [so it’s] hard not to buy it.” (Lucan, p705).*

187

188 Articles mentioned green grocers⁽⁴⁰⁾ and other stores either closing down or moving out of the area
189 due to lack of trade⁽⁴¹⁾ or overwhelming competition⁽⁴⁰⁾. Reference was also made to the lack of
190 larger, high quality supermarkets within neighbourhoods, forcing consumers to shop outside of their
191 local area⁽⁴²⁾.

192

193 Culturally and linguistically diverse populations located in both the United States and United
194 Kingdom referred to the difficulties in obtaining traditional foods due to limited availability⁽³⁴⁾.

195 Consumers would often choose to frequent particular stores because of cultural availability and
196 variety of ethnic foods⁽⁴³⁾, yet rejected stores that sold unfamiliar items or those catering for other
197 ethnic groups⁽⁴⁴⁾.

198

199 One United States-based article identified the phenomenon of local food environments being both
200 “raced” and “classed” with a clear segregation of food stores being a result of racism and
201 oppression⁽⁴⁵⁾. Minority communities such as African American communities were often in areas

* The concept of affordability in this review has been discussed within the context of the broader food environment (price differences between rather than within food stores) and was therefore seen to align with the community nutrition environment instead of the consumer nutrition environment

202 with little or no availability of healthy foods⁽⁴⁵⁾. Subsequently it was identified that “white” areas
203 often had better availability, as well as variety and quality of foods⁽⁴⁶⁾, with good food stores
204 generally perceived to be in better areas of town^(45; 47). Marked differences were seen in both the
205 availability and quality of foods sold in predominantly African American areas⁽⁴⁸⁾ or low-income
206 communities, **including populations from the Netherlands and Australia^(17; 40)**, compared to those in
207 white and more privileged areas ⁽⁴⁵⁾ and thus food quality was also a function of store clientele⁽⁴⁷⁾.

208

209 *“Same price. Low quality...food is directed to the area.” (Kumar, p374).*

210

211 Equity issues were also identified **solely in United States populations** through chain stores stocking
212 different products depending on the neighbourhood⁽⁴⁵⁾, thus potentially highlighting inequitable
213 access to food choices⁽⁴⁶⁾. Local food environments tended to mirror the social class of the
214 community and consumers endeavoured to shop at stores congruent with their social status, clearly
215 highlighting class differences in where people shop⁽⁴⁴⁾.

216

217 **Accessibility**

218 Accessibility was identified as a key determinant of food purchasing behaviours in terms of where
219 food stores were located as well as transport options that facilitate access and was discussed in 18
220 articles **from the United States, United Kingdom and Australia and was particularly evident for**
221 **lower socio-economic groups**. A number of barriers to accessing local stores were identified^(17; 45),
222 including having to rely on others for use of private vehicles^(49; 50; 51; 52) or only being able to
223 frequent nearby convenience stores if access to private or public transport was not an option^{(41; 45; 46;}
224 ⁵³⁾.

225

226 *“I mean, you’re not fixing to find any foods or anything in the convenience store. It’s a*
227 *horrible thing, you know, for those who don’t have it [transportation], because they are*
228 *forced to go to one of those convenience stores...They [the stores] don’t have real food over*
229 *there”. (Freedman, p388).*

230

231 References were also made to the sporadic availability of jitneys (informal taxi service)⁽⁴⁸⁾ at certain
232 local stores, therefore limiting store choice for those reliant, primarily African American
233 communities, on this form of public transport⁽⁴⁷⁾.

234

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235 Given the sub-optimal availability of items in local stores, good food stores were often seen as
236 being far away⁽⁴⁵⁾. Afforded the opportunity, preference was given to leaving the local community
237 and traveling further for food to obtain better quality and variety of foods as well as to save
238 money^(42; 49) and this was particularly due to dissatisfaction with neighbourhood stores **within**
239 **United States-based localities**⁽⁴⁸⁾.

240

241 Walkability was a key priority for **low income and minority population groups within the United**
242 **Kingdom and United States populations** without access to cars^(41; 46; 48; 49; 51; 54). Articles also made
243 reference to the influence of transportation mode on shopping frequency^(51; 52). Access to private
244 motor vehicles usually meant less frequent shopping trips compared to more frequent trips made by
245 those who walked or used public transport⁽⁴⁸⁾, the latter of which also needed to factor in the cost of
246 each trip^(41; 42). Public transport was also seen as impractical and difficult when required to transport
247 heavy groceries home, especially fruit and vegetables, or to shop with young children^(41; 49; 50; 52).
248 Thus location of and access to stores was a key determinant to buying and consuming fresh
249 produce^(35; 50).

250

Affordability

252 Twelve **primarily United States-based** articles referred to distinct differences in price depending on
253 the type of store. Corner stores^(41; 42; 48; 52; 53; 54) and meat markets^(46; 52) were usually said to be much
254 more expensive than supermarkets, chain superstores⁽⁴⁴⁾ or public markets⁽⁵⁵⁾.

255 *“Milk is normally 79 pence for the big jugs. I just go down to the [store] and get it there*
256 *because up here it's [1 pound]...” (Piacentini, p150).*

257

258 Consumers often referred to local food stores as over-priced^(43; 45; 46; 52; 53) and taking advantage of
259 local residents^(46; 53). Specific reference was also made to the same items in different stores being
260 more expensive⁽⁴²⁾.

261

CONSUMER NUTRITION ENVIRONMENT

263

In-store food availability

265 In-store availability of fruit, vegetables and meat was reported as a key driver of food store
266 choice^(41; 56) and was discussed in 15 articles **from the Netherlands, United States and United**
267 **Kingdom**. Contrary to this, however, the availability of fresh produce was often referred to as
268 unreliable and sporadic^(36; 45), **especially in lower socio-economic areas**. Corner stores and mini-

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269 markets were described as having less variety^(48; 53) and fewer (if any) healthy items or
270 alternatives^(42; 44; 45; 46; 57) than supermarkets^(44; 45). Local food stores tended to be stocked with
271 unhealthy snack foods, cold drinks, cigarettes and beer⁽⁴⁵⁾. Consequently this limited the variety of
272 healthy food people had access to, particularly if they were reliant on corner stores for their food
273 purchasing⁽⁵⁷⁾.

274

275 *“Far as fruit, there ain’t no fruit there [at the local convenience store]. I don’t remember*
276 *seeing no kind of, you know, like oranges, bananas, apples, tangerines, peaches; I don’t see*
277 *none of that down there. They ain’t got no fruits or nothing.” (Freedman, p390).*

278

In-store food quality

280 Nine articles **predominantly based in the United States**, reported on customer concern regarding
281 poor quality and safety of foods they could select from^(41; 42; 48; 53). Consumers mentioned displays
282 of withering fruit and vegetables^(43; 45; 46; 53), canned goods and meats close to expiration^(43; 47) and
283 spoiled or rotting meats^(42; 46; 48). Consumers discussed closely inspecting food prior to
284 purchasing⁽⁴³⁾ but also refusing to purchase fresh produce because of quality⁽⁵⁸⁾, opting to buy
285 canned produce instead, or purchasing fresh foods from outside the community^(45; 46). Reference
286 was also made to deceptive sales practices utilised by stores to disguise spoiled produce⁽⁴²⁾,
287 resulting in distrust of local food stores.

288

289 *“I just take for granted when I go to the store that it’s going to be fresh, but not around*
290 *here; here sometimes you have to blow the dust off and check the date.” (Webber, p300).*

291

Food store characteristics or features

293 Eight articles **(seven from the United States and one from the United Kingdom)** identified specific
294 features or characteristics of food stores that play a role in influencing a person’s decision to
295 frequent a particular store and make food purchases, including in-store promotions and product
296 placement, as well as cleanliness and customer service. **Such factors were mostly referred to in**
297 **minority or lower socio-economic communities.**

298

In-store promotions and product placement

300 In-store marketing, promotions and sales were discussed in relation to their influence on promoting
301 purchasing decisions. These promotions were helpful for some who searched for items on sale⁽⁵⁴⁾,
302 while others perceived them to be exploitive and complicated⁽⁴³⁾. Specific reference was made to

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303 the heavy promotion of junk foods in terms of price, as well as their placement within the store to
304 encourage unhealthy purchases⁽⁵⁸⁾. Consumers often made comment on displays put at store
305 entrances to catch their attention, “wall of values” and junk foods placed directly in front of healthy
306 items such as fresh produce⁽⁵⁷⁾. It was also noted that promotions and sales rarely applied to fresh
307 produce⁽⁴³⁾.

308

309 *“It’s all thee buy-one-get-one-free on big bars of chocolate and big cakes ... but you never*
310 *see buy-one-get-one-free by big bags of fruit.” (Lawrence, p1008).*

311

312 Further to marketing and sales often favouring unhealthy foods, a couple of articles discussed the
313 fact that healthier food items were not easily identifiable within store. They mentioned that healthy
314 items were available but difficult to identify⁽⁵⁸⁾ due to their placement and marketing⁽⁴⁶⁾. Although
315 some stores had separate sections for their healthy products, there was a general lack of shelf
316 labelling to identify such items, with labels usually used only to highlight product prices and
317 specials⁽⁵⁸⁾.

318

Cleanliness

320 Store cleanliness was reported as an important determinant of store choice⁽⁵⁶⁾. Clean stores were
321 associated with perceptions of fresh and wholesome food⁽⁴³⁾ with customers also associating poor
322 upkeep with poor quality food⁽⁴⁶⁾. Consumers discussed refusing to shop in a particular store if the
323 cleanliness did not meet expectations^(45; 46).

324

325 *“I walked in the store and it was just like nasty... we’re not fixing to get nothing from up out*
326 *of here because they’ve got roaches and the floor is filthy dirty. I’m gone.” (Zenk p285).*

327

Customer service

329 Poor attitudes and a lack of courtesy were identified as barriers to food purchasing and patronising
330 certain stores^(42; 46). Several articles discussed what patrons look for in terms of good customer
331 service such as staff that are adequately trained^(43; 44), are helpful to customers in finding particular
332 items^(44; 56) and reasonable management who a receptive to feedback and handling complaints⁽⁴³⁾.
333 Customers looked for welcoming environments where they were greeted upon arrival⁽⁵⁶⁾, made to
334 feel accepted, treated with respect and on a first name basis with management or employees.
335 Customers expected a degree of service that was in line with the demeanour of the particular store,
336 however customers reported differing attitudes depending on the store they shopped in⁽⁴³⁾.

337

338 **OTHER ENVIRONMENTAL FACTORS**

339

340 **Influence of media and advertising**

341 Four articles (two from the United States and one each from Canada and the United Kingdom)

342 discussed the role of television-based media or outdoor advertising of fast food as influences on

343 people's food choices. One article attributed the choice of out of home eating establishment to

344 advertising and marketing techniques⁽³⁷⁾. Media was identified as an important influence on diet⁽³⁵⁾

345 and children's pester power and request for unhealthy foods whilst grocery shopping was attributed

346 to particular products being seen on television⁽⁵⁹⁾.

347

348 **Other environmental factors**

349 Factors broader than the food environment were also identified as having an influence on people's

350 choice of shopping location such as neighbourhood characteristics and safety concerns, which were

351 identified in four United States-based articles. People spoke of being hassled by loiterers in front of

352 food stores⁽⁴⁶⁾, nearby drug sales or alcohol related violence⁽⁴⁴⁾ as well as general safety in grocery

353 store car parks⁽⁵⁶⁾. Personal safety was identified as a determinant of shopping location⁽⁴⁸⁾ with

354 people choosing to avoid stores where they had heard of violent incidents occurring⁽⁵⁶⁾.

355

356 *"I don't really like going certain places... cause I just don't feel safe..." (Zenk, p286).*

357

358 **INDIVIDUAL COPING STRATEGIES FOR SHOPPING AND PURCHASING DECISIONS**

359

360 **Coping strategies within the Community Nutrition Environment**

361 Sixteen articles from the United States, United Kingdom and Mexico identified the resourcefulness

362 of people in their use of food stores within the food environment to suit their needs and

363 requirements. Thus consumers were seen to actively adapt to their local food environment^(43; 44).

364 Such strategies included shopping at multiple stores or locations^(43; 46; 57; 60) and also frequenting

365 certain stores for specific purchases^(43; 44; 46) due to both cost and preference considerations. For

366 example, purchases made at corner stores were limited to just essential items because of their

367 inflated prices^(41; 44; 52; 54; 60). People also chose to shop at stores that were most convenient in

368 undertaking their errands or fit with their routine⁽⁴⁴⁾. Others prioritized shopping convenience over

369 all other factors^(43; 58) in an endeavour to frequent stores that were conveniently located⁽⁵⁶⁾, including

370 shopping at the one location^(43; 55).

371

372 **Coping strategies within the Consumer Nutrition Environment**

373 A number of individual approaches to food shopping and purchasing within food stores was
374 discussed in 24 of the included articles **from all study localities**, with cost frequently referred to as
375 the primary factor that dominated purchasing priorities, particularly for people of lower socio-
376 economic status^(39; 41; 42). People sought to minimise purchasing costs at the expense of all other
377 purchasing considerations. Cost was deemed to be a more important consideration than the
378 nutritional quality of foods⁽³⁶⁾ and also dictated unhealthy food purchases regardless of people's
379 preferences for healthier items⁽⁵⁸⁾;

380

381 *"I know exactly what we should be eating and what would be healthy and all that and I'm*
382 *really frustrated that we can't eat that way...because there just ain't enough money..."*
383 *(Wiig Dammann, p246).*

384

385 Cost was deemed a barrier to purchasing healthy items such as fruit and vegetables^(17; 35; 50; 56; 58; 61)
386 **in the United States, United Kingdom and Australia**, with healthy foods perceived as being more
387 expensive⁽⁴²⁾ and unhealthy items seen as more cost effective alternatives^(58; 61). However, others
388 found it more cost effective to buy fresh and seasonal foods rather than pre-packaged and pre-made
389 items⁽⁵⁹⁾ or thought it was possible to eat healthy⁽⁵¹⁾ if junk food purchases were reduced^(38; 52).

390

391 **Regardless of study locality**, articles discussed an array of in-store purchasing behaviours that
392 people, **predominantly of lower socio-economic status**, applied to minimise the cost of their
393 shopping. Techniques included searching for items on sale^(43; 49; 51; 54; 57; 58); buying items in bulk^{(49;}
394 ^{54; 60)}; comparing prices^(41; 58); buying store brands^(51; 54); settling for cheaper cuts of meat^(51; 60);
395 trying to get the best value for money^(41; 58; 61); and refusing to buy certain items if they were
396 considered too expensive⁽⁴³⁾.

397

398 Consumers discussed the importance of ensuring an adequate quantity of food for their family
399 rather than quality food within their budget constraints^(51; 52; 56; 58). One article **from the United**
400 **Kingdom** also discussed various in-store shopping styles routinely applied within the store
401 environment, including 'restricted and budgeted' shoppers, characterised by very controlled and
402 planned purchases, often within the confines of price considerations⁽⁶²⁾.

403

404 For those of higher socio-economic status from United States, Australian and Mexican populations,
405 cost rarely drove purchasing decisions⁽³⁹⁾, which were instead prioritised by taste and food quality
406 preferences, the convenience of accessing foods as well as the health benefits of their food
407 choices^(17; 55).

408

409 **Discussion**

410

411 This review sought to synthesise qualitative evidence regarding the influence of the local food
412 environment on food and purchasing behaviours. Availability, accessibility and affordability were
413 consistently identified as key determinants of store choice and purchasing behaviours that often
414 resulted in less healthy food choices within community nutrition environments. Food availability
415 and quality within stores, and food store characteristics within consumer nutrition environments
416 also greatly influenced in-store purchases. Media and advertising as well as other environmental
417 characteristics each influenced food purchasing behaviours. People used a range of individual
418 coping strategies in both the community and consumer nutrition environments to make optimal
419 purchasing decisions, often within the context of financial constraints.

420

421 Findings also identified distinct differences in themes that emerged from the articles depending on
422 whether they were based within United States populations or elsewhere. It appears the key themes
423 of affordability (within the community nutrition environment) and in-store food quality and food
424 store characteristics or features (within the consumer nutrition environment) were more often
425 discussed in articles from the United States. In addition to this, race-based factors were solely
426 discussed in United States-based articles. This potentially highlights between-country variations and
427 thus contextual differences between food and social environments^(63; 64) For example, whilst
428 evidence tends to suggest the presence of cost and access disparities for low income and minority
429 communities in the United States, this is not necessarily consistent in other countries such as the
430 United Kingdom^(64; 65) Differences in the actual food environments and people's use of these
431 between countries can make research undertaken in different contexts difficult to compare^(1; 64).

432

433 All but three articles had a specific focus on or discussed socioeconomic factors both at the
434 community or individual level and their influence on food acquisition. It was not surprising
435 therefore that cost of food was continually identified as the most important influence. This finding
436 reinforces the importance of socioeconomic status and its contribution to disparities in food access,
437 availability and cost and is generally supported within the available literature^(66; 67; 68).

438

439 Quality assessment outcomes of included articles was concerning for aspects of research design and
440 reporting but were not formally used to separate study results. Poorer quality articles were included,
441 given their novelty and potential to still provide a rich and insightful contribution to the findings
442 generated from this review. Regardless, there is a need to ensure high quality and rigorous
443 processes and reporting whilst undertaking future qualitative research endeavours.

444

445 Although the current review was focused on the role of environmental determinants on food
446 behaviours, the synthesis identified challenges in seeking to explore environmental factors in
447 isolation from other social-ecological determinants of behaviour. Indeed, consideration of the
448 inequalities and challenges experienced by lower socioeconomic and minority populations in
449 accessing and making purchasing decisions within the food environment was key to consolidating
450 findings across studies. Food and purchasing decisions are influenced by more than just the
451 environment and thus the importance of intra- and interpersonal, social and cultural factors that
452 influence behavior, must not be underestimated⁽⁶⁹⁾. Policy and behavioural change interventions
453 should still embrace a socioecological approach beyond exploration of the environmental
454 determinants presented in the current review⁽⁷⁰⁾.

455

456 Synthesis also highlighted distinct individual approaches to food shopping and purchasing within
457 the community and consumer nutrition environments, primarily due to socioeconomic (financial)
458 constraints. These approaches demonstrate the dynamic interplay between structural barriers that
459 exist within the environment and the capacity of human agency when faced with limited
460 community, social and financial resources⁽⁴⁸⁾, which cannot be overlooked in terms of the influence
461 of solely environment on food behaviours⁽⁷¹⁾. An individual's agency is also underpinned by their
462 motivation, ability and opportunity in undertaking certain behaviours⁽⁷²⁾, as seen by the array of
463 coping mechanisms applied and demonstrated through people's resourcefulness and adaptation to
464 their food environments to meet their purchasing requirements. However agency is limited,
465 particularly if structural constraints are too difficult to overcome⁽⁴⁸⁾.

466

467 The current review is not without its limitations. The systematic search process included empirical
468 literature published in peer-reviewed journals and thus did not incorporate grey literature,
469 government reports or forthcoming research, potentially missing other important contributions in
470 the field. Furthermore, the scope of the review was limited to only including community and
471 consumer food environments and therefore excluded research in organisational environments

472 including schools, childcare centres, workplaces and the home environment due to the additional
473 breadth and diversity of outcomes that would result from their inclusion. A vast majority of the
474 included articles (n=19) were from research undertaken in the United States and given the
475 variability within these food environments and also compared to other countries, this could impact
476 the applicability of findings and result in an inability to make generalisations to different
477 populations. Finally, this review did not incorporate synthesised results regarding food security
478 issues and the use of food assistance programs, and although mentioned in a number of articles
479 (n=9), it was deemed this topic could not be adequately addressed within the chosen scope of this
480 review, given its breath, scope and complexity.

481

482 To our knowledge, this is the first systematic review to synthesise qualitative research on the local
483 food environment and food consumption and purchasing behaviours. The findings from this
484 synthesis will assist in providing a deeper and more comprehensive understanding of environmental
485 determinants within community and consumer nutrition environments that are consistent with
486 findings from quantitative research in the field^(64; 66). **Moreover, they may help to explain the**
487 **inconsistent quantitative associations found between the food environment and dietary behaviours**
488 **by emphasising the complexity and diversity of contextual factors that exist within these**
489 **environments.**

490

491 Future research should focus on integrating findings from qualitative and quantitative food
492 environment syntheses in order to generate both new and refined hypotheses for ongoing research
493 into the associations between aspects of the food environment and health/diet related behaviors.
494 Given the significant focus of included articles on socioeconomic determinants, future research
495 could explore how different people use the same food environment, that is, what characteristics
496 result in individuals using food environments in different ways. This synthesis provides a
497 summation of qualitative literature that could be used to guide policy formation and continue to
498 develop tailored and multi-component interventions within food environment research.

499

500 **Conclusion**

501

502 Environmental factors continue to be identified as pertinent determinants of food store selection and
503 purchasing behaviour. Regardless of an individual's ability to cope with less than optimal
504 environments through the power of human agency, the environment needs to be modified and
505 improved in order to maximise health-related outcomes. There is a need to investigate contextual

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506 influences within food environments as well as individual and household socioeconomic
507 characteristics that contribute to the differing use and views towards local food environments.
508 Greater emphasis on how individual and environmental factors interact in the food environment
509 field will be key to developing stronger understanding of how environments can support and
510 promote healthier food choices.
511

Table 1: Summary characteristics of included studies

Author & Year	Location	Sample	Population characteristics	Data collection method	Topics addressed
Baruth 2014	United States	N=28 females	Low income; Predominantly African American ethnicity	Focus groups (N=4)	Perceptions and experiences of barriers to healthy eating
Bridle-Fitzpatrick 2015	Mexico,	N=20 females	Latino ethnicity; Varying SES	Interviews (N=20)	Availability, access, and exposure to healthy and unhealthy foods; Interactions with and perceptions of food environments
Cannuscio 2014	United States	N=25 (16 female, 9 male)	More than half African American ethnicity	Interviews (N=25)	Socioecological determinants of food shopping; Interactions with and within the local food environment
Clifton 2004	United States	N=27 (24 female, 3 male)	Low SES; More than half Latino ethnicity	Interviews (N=27)	Accessibility as a barrier to food acquisition
Dwyer 2008	Canada	N=39 (34 female, 5 male)	Predominantly Caucasian Ethnicity	Focus groups (N=5)	Experiences and challenges of parents in supporting healthy eating among their preschool children
Freedman 2009	United States	N=20 (14 female, 6 male)	Predominantly African American ethnicity	Interviews (N=20)	Perceptions and experiences of food access
Hendrickson 2006	United States	N=22 (15 female, 7 male)	Half Caucasian ethnicity	Focus Groups	Consumer perceptions on food availability
Inglis 2005	Australia	N=56 females	High and low SES	Interviews	Dietary behaviours among varying levels of SES
James 2014	United States	N=40 (19 female, 21 male)	African American ethnicity;	Focus groups (N=6)	Socioecological determinants of food choices and dietary intake

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			Varying SES		
Kamphuis 2007	Netherlands	N=38 (17 female, 21 male)	Varying SES	Focus groups (N=4)	Socioecological determinants of fruit and vegetable consumption
Krukowski 2012 *	United States	N=48 (46 female, 2 male)	More than half African American ethnicity	Focus groups (N=5)	Socioecological determinants of food store choice
Kumar 2011	United States	N=14 (13 female, 1 male)	African American ethnicity	Focus groups (N=2)	Perceptions of the neighbourhood nutrition environment
Lawrence 2009	United Kingdom	N=56 females	High and low SES	Focus groups (N=11)	Socioecological determinants of food choices
Lindsay 2008	United States	N=51 females	Latino ethnicity	Focus groups (N=6) and interviews (N=20)	The influence of social class, culture and environment on food behaviours
Lucan 2012	United States	N=33 (18 female; 15 male)	Low Income; African American ethnicity	Interviews (N=33)	Perceived socioecological influences on the consumption of fruits, vegetables and fast foods
McGuffin 2014	United Kingdom	N=186 (104 female, 82 male)	Caucasian ethnicity	Focus groups (N=24)	Factors influencing family out of home eating
Munoz-Plaza 2007	United States	N=25 (13 female and 12 male)	African American ethnicity	Focus Groups (N=3)	Perceptions of the local food environment; barriers to healthy eating
Piacentini 2001 †	United Kingdom	N=21	Caucasian ethnicity	Interviews (N=21)	Grocery shopping behaviours and related influences

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Rawlins 2012	United Kingdom	N=43 (34 female, 9 male)	Ethnically diverse	Focus groups (N=8) and interviews (N=5)	Barriers and facilitators to healthy eating
Rose 2011	United States	N=47 (25 female; 22 male)	African American ethnicity	Interviews (N=47)	Food acquisition behaviours and related factors
Tach 2015	United States	N=66	Low income; Predominantly African American ethnicity	Interviews (N=66)	Food acquisition behaviours and related factors
Thompson 2013	United Kingdom	N=26 (16 female; 10 male)	Predominantly Caucasian ethnicity	Interviews (N=26)	The influence of the supermarket environment on food shopping behaviours
Webber 2010 *	United States	N=28 (24 female; 3 male)	Predominantly Caucasian ethnicity; Low SES	Interviews (N=28)	Within store purchasing decisions and related factors
Whelan 2002 †	United Kingdom	N=35	Low SES; Mothers with children	Focus groups (N=5)	Food shopping behaviours, consumption patterns and attitudes towards a healthy diet
Wiig 2009	United States	N=92 females	Low SES; More than half African American ethnicity	Focus Groups (N=14)	Grocery shopping behaviours and influencing factors
Wiig Dammann 2009	United States	N=92 females	Low SES; More than half African American ethnicity	Focus Groups (N=14)	Socioecological determinants of food choices
Withall 2009	United Kingdom	N=27 (26 female; 1 male)	Low SES; predominantly overweight or obese	Interviews (N=8) and focus groups (N=5)	Barriers to consuming a healthy diet

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Yen 2007	United States	N=52 females	Predominantly Latino ethnicity; Varying SES	Focus Groups (N=8)	Neighbourhood perceptions and associations with poor diet
Zachary 2013	United States	N=46 (40 female, 6 male)	Predominantly African American ethnicity	Interviews (N=32) and Focus Groups (N=3)	In-store food purchasing decisions
Zenk 2011	United States	N=30 females	Low SES; African American ethnicity	Interviews (N=30)	Food acquisition behaviours and their environmental influences

SES=Socioeconomic status

Note: Information in the above table represents information/participants that met the inclusion criteria. For example, if a study used a mixed methods research design, details are not provided on the number of survey participants in the study or if the study incorporated both rural and metropolitan areas, details on the rural participants (if made explicit) have not been provided.

* Number of rural participants can't explicitly be identified and excluded from the sample

† Number of females and males not identified

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Table 2: Summary of analytic and key descriptive themes across studies

ARTICLE	The Community Nutrition Environment			The Consumer Nutrition Environment		Other Environmental Factors		Individual coping strategies for shopping and purchasing decisions	
	Availability	Accessibility	Affordability	In-store food availability	Food store characteristics or features	Influence of media and advertising	Other Environmental factors	Coping strategies within the Community Nutrition Environment	Coping strategies within the Consumer Nutrition Environment
BARUTH	-	-	-	-	-	-	-	Y	-
BRIDLE-FITZPATRICK	-	-	Y	-	-	-	-	Y	Y
CANNUSCIO [†]	Y	Y	Y	-	Y	-	Y	Y	Y
CLIFTON	-	Y	-	-	-	-	-	-	Y
DWYER*	-	-	-	-	-	Y	-	-	Y
FREEDMAN [†]	Y	Y	-	Y	Y	-	-	-	-
HENDRICKSON	Y	Y	Y	Y	-	-	-	-	-
INGLIS	Y	Y	-	-	-	-	-	-	Y
JAMES	-	-	-	Y	-	-	-	-	Y
KAMPHUIS	Y	-	-	Y	-	-	Y	-	Y
KRUKOWSKI	-	-	-	Y	Y	-	-	Y	Y
KUMAR [†]	Y	Y	Y	Y	-	-	-	-	-
LAWRENCE	-	Y	-	-	Y	-	-	-	Y
LINDSAY	Y	Y	-	Y	-	Y	-	Y	-
LUCAN [†]	Y	Y	Y	-	-	Y	-	-	Y
MCGUFFIN*	-	Y	-	-	-	Y	-	-	Y
MUNOZ-PLAZA	Y	Y	Y	Y	Y	-	-	Y	Y
PIACENTINI	Y	Y	Y	Y	-	-	-	Y	Y
RAWLINS [†]	Y	-	-	-	-	-	-	Y	Y
ROSE [†]	-	Y	-	Y	-	-	Y	Y	Y

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TACH [†]	Y	Y	Y	-	-	-	-	Y	Y
THOMPSON*	-	-	-	-	-	-	-	-	Y
WEBBER	Y	-	Y	Y	Y	-	-	Y	Y
WHELAN	-	Y	-	Y	-	-	-	Y	Y
WIIG	-	Y	Y	-	-	-	-	Y	Y
WIIG									
DAMMANN	-	Y	Y	-	-	-	-	Y	Y
WITHALL	Y	-	-	Y	-	-	-	-	Y
YEN	Y	-	-	-	-	-	-	-	-
ZACHARY	-	-	-	Y	Y	-	-	Y	Y
ZENK [†]	Y	Y	Y	Y	Y	-	Y	Y	Y

* Socio-economic factors not considered or discussed within articles (n=3)

[†] Racial or culturally diverse factors discussed within articles and pertaining to key themes (n=8)

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