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Drivers of dietary behaviours in women living in urban Africa: a systematic mapping review

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Abstract

Objective: To (i) systematically review the literature to determine the factors influencing diet and dietary behaviour in women living in urban Africa; (ii) present these in a visual map; and (iii) utilize this to identify potentially important areas for future research.

Design: Systematic mapping review. The review protocol was registered at PROSPERO (http://www.crd.york.ac.uk/PROSPERO/; registration number CRD42015017749). Six databases were systematically searched, followed by reference and citation searching. Eligibility criteria included women aged 18–70 years living in urban Africa, any design/methodology, exploring any driver, using any measure of dietary behaviour. Quality appraisal occurred parallel with data extraction. Twelve predominantly cross-sectional quantitative studies were included; reported in seventeen publications. Determinants were synthesized narratively and compiled into a map adapted from an existing ecological model based on research in high-income countries.

Setting: Urban Africa.

Subjects: African women aged 18–70 years.

Results: Determinants significantly associated with unhealthy dietary behaviour ranged from the individual to macro level, comprising negative body image perception, perceptions of insufficient food quantity and poorer quality, poorer food knowledge, skipping meals, snacking less, higher alcohol consumption, unhealthy overall lifestyle, older age, higher socio-economic status, having an education, lower household food expenditure, frequent eating outside the home and media influence. Marital status and strong cultural and religious beliefs were also identified as possible determinants.

Conclusions: Few studies have investigated drivers of dietary behaviours in urban African settings. Predominantly individual-level factors were reported. Gaps in the literature identified a need for research into the neglected areas: social, physical and macro-level drivers of food choice.

Keywords
Food choice
Africa
Women
Urban
Determinants
Diet

The epidemiological transition is accompanied by the nutrition transition towards foods rich in saturated fat and sugar[1,2], which, combined with lower levels of physical activity and sedentary behaviour[3], lead to a rise in overweight, obesity and nutrition-related non-communicable diseases (NR-NCD) including type 2 diabetes and CVD[4]. These transitions occur more rapidly in low- and middle-income countries[5] and consequently the pace of the rise in obesity and NR-NCD in such countries appears faster[6]. Over 80 % of NR-NCD deaths now occur in low- and middle-income countries[7] where, notably, obesity is expected to increase proportionally by a larger amount compared with high-income countries[8].

Obesity/overweight prevalence is higher among women in Africa[8]; almost twice as high as in men[9]. Urbanization has been cited as an important driver for NR-NCD and overweight/obesity increases in women[10,11], but factors other than urban residence seem to contribute towards overweight and obesity, particularly socio-economic status (SES)[11]. The gender disparity in overweight/obesity, in addition to that in urban *v.* rural settings, explains the present review's specific focus on urban African women.

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The WHO's response to the rising burden of NR-NCD includes global prevention strategies[12,13] focusing on modifiable behaviours and social determinants through creating healthier environments. Some research exists into the various factors driving obesity in Africa[14–16] but the available research hails predominantly from high-income countries[4] and greater insight into the specific determinants of dietary behaviour would guide culturally appropriate and hence more effective interventions.

An 'ecological' framework of the drivers of food choice has been developed to visually assemble the various factors into four levels[17]. The individual level includes demographics, behaviours and cognitions (e.g. attitudes, preferences, knowledge and values), which affect food choice via characteristics including self-efficacy, motivation and behavioural capacity. Environmental factors are separated into social (family and peers), physical (where food is consumed and procured) and macro (social norms, marketing, etc.) environmental levels. This visual map serves to illustrate the relationships between the various levels and, notably, between people and their environment. This model complements the vast discourse surrounding the social determinants of health inequalities; the so-called 'causes of the causes'[18]. It of particular interest to the present review as it focuses on the relationship between levels (and the factors therein) and subsequent eating behaviours, as well as possible areas for effective policy intervention[17]; however, most of the source data hail from high-income countries[17].

The study objective was to determine the factors influencing dietary behaviour among women living in urban Africa, map them visually, and identify any gaps and/or priority areas for future research.

Methods

This research topic is novel for this population; therefore a mapping review is ideal for conceptualizing the determinants in the literature and identifying neglected areas[19]. Systematic searches of the literature were conducted according to a predefined protocol published on PROSPERO[20]. Preliminary scoping searches yielded studies with dietary diversity as the outcome, which is desirable as research has determined dietary diversity to be a key component of healthy diets[21]. The SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Research type) tool was utilized to develop the eligibility criteria (see online supplementary material, Supplemental Table 1) and the review question as it is more suited to qualitative and mixed-methods research[22]. The eligible population comprised women aged ≥18 and <70 years living in urban Africa. Language was limited to English and French. No publication type limit was applied to yield an adequate representation of the relevant available literature. Following scoping searches, the date was limited to 1971 onwards as studies concerning health behaviour in the context of the epidemiological transition began at that time[23]. The search strategy (see Supplemental Table 2) was then used on six online databases in April 2015: EMBASE, MEDLINE, PsychINFO, CINAHL, ASSIA and African Index Medicus. The WHO International Clinical Trials Registry (ICTRP) was searched for ongoing trials and the University of Sheffield Library Catalogue (STARPlus) for relevant theses. The reference lists of included literature and records citing them were also searched alongside data extraction and quality assessment.

Records yielded by the search strategy underwent duplicate removal, title and abstract screening, and full-text screening by a single reviewer; 10 % of excluded records at the title/abstract and full-text screening stages were checked for adherence to the protocol by another reviewer. Complete concordance between reviewers was apparent at both checking stages. Reasons for exclusion at the full-text stage were recorded.

Included studies also underwent quality assessment to increase internal validity[24]. This process was undertaken by two reviewers independently, compared, and differences resolved via discussion. The Standard Quality Assessment Criteria for Evaluating Primary Research Papers From a Variety of Fields was used because it is applicable to both the quantitative and qualitative studies yielded in the present review, having a separate checklist and scoring process for each[24]. All checklist items had a defined 'yes', 'no', 'partial' or 'N/A' grading[24].

Data were extracted from included studies initially by a single reviewer with a standardized form which was initially piloted and modified appropriately. Extracted data comprised that presented in Tables 1 and 2, with the addition of a column for 'effect of determinant(s) on dietary behaviour' and how each determinant and dietary behaviour was measured (the latter being reported in the online supplementary material, Supplemental Tables 3–6). Income level was categorized according to the World Bank[25], and the level of each determinant was guided by the ecological framework[17]. Extracted data were then checked by another reviewer as double data extraction is more valid[26]. Extracted data informed the iterative synthesis of a visual 'map' of drivers of dietary behaviour to gain a sense of the nature of research available within the topic area. Drivers identified by the review were matched where appropriate to the aforementioned ecological model[17], which was adapted to account for any novel drivers. Reporting of the review followed the PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) checklist where applicable[27].

Results

Search results

The search strategy yielded 4722 title and abstract records after duplicates were removed (Fig. 1). One hundred and

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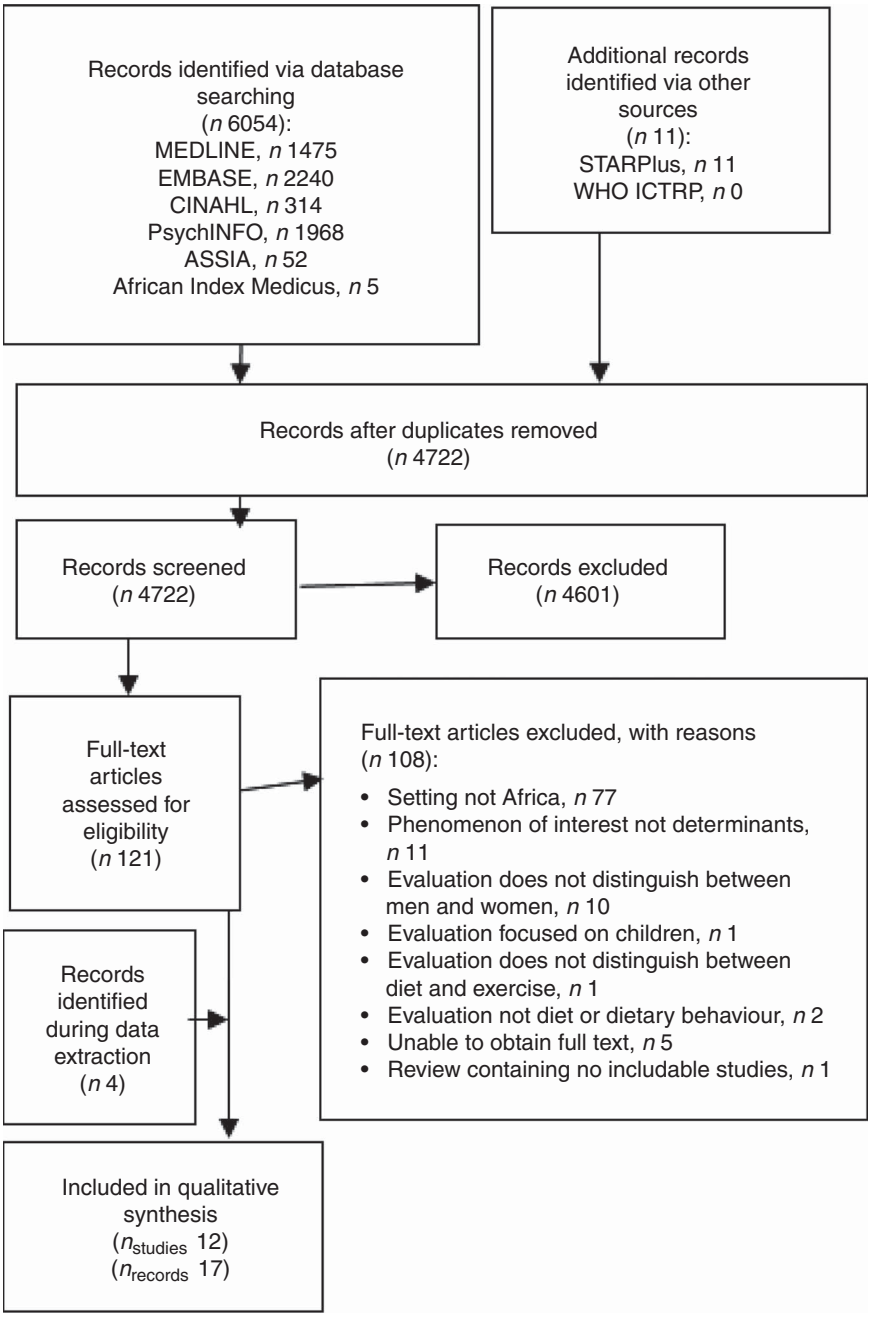

Fig. 1 PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses) flow diagram showing the selection of studies for the present systematic mapping review

twenty-one records remained for full-text retrieval, at which stage 108 records were excluded. The resulting twelve included studies were reported in seventeen records[28–44].

Description of studies

Table 1 presents the characteristics of the twelve included studies. Two were qualitative[28,38], one used mixed methods[29] and the remaining nine were quantitative[29–33,35–37,39–44]. One abstract was included as sufficient data were obtained by an author[31,45]. Two studies were set in low-income countries: Burkina Faso[39,40] and Benin[42]. Seven were from lower-middle-income countries; four from Morocco[28,30–32,38], two were Kenyan[33,44] and one Ghanaian[34]. Three studies were situated in South Africa; an upper-middle-income country[29,35–37,43].

Quality assessment

Nine of the twelve studies achieved scores ≥75 % (Table 1), indicating that the overall quality of the studies was fairly high. Strengths comprised sufficient description of the study question/objective, sample selection/characteristics, data analysis and appropriate design/sample

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Table 1 Characteristics of included studies

Study	Design, method	Setting	Income level	Sample characteristics	No. of participants	Sampling/recruitment	QAS (%)*
Batnitzky (2008)[28]	Qualitative, field study, semi-structured interviews, observation	Rabat, Morocco	Lower middle	Men and women, 20+ years	Not reported	Unclear – individuals then households from non-profit organization	60
Charlton *et al.* (2004)[29]	Mixed, cross-sectional, questionnaire, focus groups	Cape Town and Pretoria, South Africa	Upper middle	Black African women, 17–50 years (questionnaire) 18–49 years (focus groups)	394 (questionnaire) and 39 (focus groups)	Convenience, according to age and sex	75
Hattingh *et al.* (2011, 2006, 2014)[35–37]	Quantitative, cross-sectional, questionnaire	Mangaung district, South Africa	Upper middle	Women, 25–44 years	488	Stratified random according to number of plots in each settlement	80
Jafri *et al.* (2013)[30]	Quantitative, cross-sectional, questionnaire	Casablanca, Morocco	Lower middle	Women, 18+ years	401	Multistage cluster. Households randomly selected within clusters	59
Landais *et al.* (2011, 2013, 2012)[31,32,45]	Quantitative, cross-sectional, questionnaire	Rabat-Salé, Morocco	Lower middle	Women, 20–49 years	894	Multistage cluster. Household addresses randomly selected from enumeration areas	100
Mbochi *et al.* (2012)[33]	Quantitative, cross-sectional, questionnaire	Nairobi, Kenya	Lower middle	Women, 25–54 years	365	Stratified random according to number of women in each socio-economic stratum	73
Mogre *et al.* (2013)[34]	Quantitative, cross-sectional, questionnaire	Tamale, Ghana	Lower middle	Men and women, 20–60 years	235	Stratified random based on number of employees in each department	80
Rguibi and Belahsen (2006)[38]	Qualitative, cross-sectional, questionnaire via interview	Laayoune, Morocco	Lower middle	Women, 15–70 years	249	Convenience. Women visiting primary-care centres	55
Savy *et al.* (2008)[39] and Becquey *et al.* (2010)[40]	Quantitative, cross-sectional, questionnaire	Ouagadougou, Burkina Faso	Low	Women, 29–50 years	481	Random, from a database containing an exhaustive list of inhabitants	95
Sodjinou *et al.* (2009, 2008)[41,42]	Quantitative, cross-sectional, survey/questionnaire	Cotonou, Benin	Low	Men and women, 25–60 years	200	Multistage cluster. Neighbourhoods, households, then individuals randomly selected	100
Van Zyl *et al.* (2010)[43]	Quantitative, cross-sectional, questionnaire	Johannesburg, South Africa	Upper middle	Men and women, 19–30 years	341	Convenience. Residents of Johannesburg visiting a mall	75
Waswa (2011)[44]	Quantitative, cross-sectional, questionnaire	Eldoret, Kenya	Lower middle	Women, 20–25 years	260	Stratified random according to university department size including each year	82

*QAS, quality assessment score.

size. The main weaknesses were lack of adjustment for confounders and insufficient description of sampling strategy, data collection and analysis.

Data synthesis

The specific determinants measured by the twelve studies span all levels of the existing ecological model (see Table 2 and Fig. 2). Components of dietary behaviour included meal content[28], food consumption[30–33,43], micro/macronutrient intake[33,35–37,44], dietary diversity[31,32,40], diet quality[28,41,42] food choice[29], eating patterns[34,40], adequacy of food intake[44] and diet practices[38] (see online supplementary material, Supplemental Tables 3–6).

Individual- and household-level determinants

Nine studies[29–37,39–42,44] reported the effects of individual- or household-level determinants (online supplementary material, Supplemental Table 3).

Cognitions

Six studies looked at the cognitive element of individual-level factors[28,31,34,39,40,44]. One study found that individual perception of taste was rated as having a 'large influence' as opposed to a 'small influence' or 'no influence' on food choice by 75 % of participants[29]. Another study found that lack of appetite and not feeling hungry were among the most common reasons for skipping breakfast[34]. Hunger and mood were not associated with adequacy of food intake in another study[44]. Perception of body image did not influence adequacy of food intake[44], except women with a positive body image reported an adequate food intake and consumed more protein than women with a negative body image[44]. One comparatively high-quality study (95 %) looked at perceptions of quality and quantity of diet and found that dietary diversity was significantly higher in those who rated the quantity of their diet as 'sufficient' *v.* 'insufficient' and dietary diversity was significantly higher in those who rated diet quality as 'rather varied' *v.* 'not varied enough'[39,40]. One study found an association between knowledge about fruit and vegetables and diversity of consumption of both (those with low knowledge ate a mean of 181 g of fruit and vegetables daily, compared with 255 g/d in those with high knowledge, $P < 0{\cdot}01$)[31]. A second study of comparatively lower quality (87 % *v.* 100 %) found that those with better knowledge of food choice were twice as likely to have inadequate protein intake (OR = 2·37, 95 % CI 1·23, 4·53)[44].

Lifestyle

Seven studies looked at individual lifestyle as determinants of dietary behaviour[29,32,34–37,39–42,44]. Skipping at least one daily meal was associated with eating fewer vegetables (152 g/d *v.* 187 g/d in those not skipping meals, $P < 0{\cdot}01$) and fruit and vegetables (305 g/d *v.* 343 g/d in those not skipping meals, $P < 0{\cdot}05$)[32]. 'Lack of time' was the commonest reason for skipping breakfast[34]. Those who skipped meals in another study were found to be three times more likely to have inadequate energy intake than those who did not (OR = 3·12, 95 % CI 1·21, 8·06)[44]. Snacking often was associated with higher dietary diversity compared with those who never snacked in Burkina Faso ($P = 0{\cdot}01$)[39,40]. One study found that a majority of women rated 'trying to eat a healthy diet' and 'habit or routine' as a 'large influence' on food choice, and 'slimming foods' was given 'low influence' by a majority[29]. There was no association between physical activity level and energy intake in one study[35–37] and another also found no association between physical activity and diet quality[41,42]. Eating from a shared bowl had no effect on fruit and vegetable consumption[32]. Smoking was not associated with diet quality in one study[41,42]; however, lower alcohol consumption and healthier overall lifestyle (less alcohol/smoking and more physical activity) were significantly associated with higher diet quality[41,42].

Biology

Biological factors were investigated in five studies[30,32,34–37,39,40,44]. One study found no differences between age groups for energy intake[35–37] and another found no age differences for fruit and vegetable diversity or consumption[32]. However, dietary diversity was reported to be higher in younger women (<25 years *v.* ≥50 years, $P < 0{\cdot}05$)[39,40]. The prevalence of fattening product consumption was also higher in younger women (17·6 % in <25 years *v.* 7·4 % in those >55 years, $P < 0{\cdot}05$)[30]. Overall health had no influence on adequacy of self-reported food intake in one study[44].

Socio-economic status

Three studies looked at socio-economic factors as determinants of food choice[31–32,39,40]. Two studies looked at SES: one found that higher status was significantly associated with higher fruit and vegetable consumption and diversity compared with lower status[31,32]; a second found that higher SES was significantly associated with higher dietary diversity score[39,40]. One Kenyan study indicated that women of higher SES may have unhealthier diets as they consumed significantly more energy-dense foods, cholesterol and alcohol[33]. There was no association between employment and dietary diversity or consumption[30,32,39,40]. Three studies looking at education were inconclusive as to whether education had a positive impact on diet[30,39,40]. Two of these studies found lower dietary diversity with low education level[39,40]; however, a third study reported no association between education level and fruit and vegetable consumption, but that the effect of education was modified by economic level, and in the lowest economic group the highest educated had higher food diversity scores ($\beta = 0{\cdot}59$ (SE 0·08) for no education *v.* $\beta = 1{\cdot}05$ (SE 0·14) for some education,

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Table 2 Determinants and dietary behaviours measured in the included studies

Level	Sub-level	Determinant (no. of studies)	Dietary behaviour	Evidence
Individual and household	Cognitions	Taste (1)	Influence on food choice	(29)
		Lack of appetite (1)	Skipping breakfast	(34)
		Not feeling hungry (1)	Skipping breakfast	(34)
		Too early to eat (1)	Skipping breakfast	(34)
		Hunger (1)	Adequacy of food intake	(44)
		Mood (1)	Adequacy of food intake	(44)
		Body image perception (1)	Adequacy of food intake	(44)
		Perception of diet quality (1)	Dietary diversity	(39,40)
		Perception of diet quantity (1)	Dietary diversity	(39,40)
		Food knowledge (2)	Dietary diversity of fruit and vegetables	(31)
			Protein intake	(44)
	Lifestyle	Skipping meals (2)	Fruit and vegetable consumption	(32)
			Energy intake	(44)
		Lack of time (1)	Skipping breakfast	(34)
		Snacking (1)	Dietary diversity	(39,40)
		Trying to eat a healthy diet (1)	Influence on food choice	(29)
		Habit or routine (1)	Influence on food choice	(29)
		Slimming foods (1)	Influence on food choice	(29)
		Physical activity (2)	Energy intake	(35–37)
			Diet quality	(41,42)
		Eating from a shared bowl (1)	Fruit and vegetable consumption	(32)
		Smoking (1)	Diet quality	(41,42)
		Alcohol consumption (1)	Diet quality	(41,42)
		Healthier overall lifestyle (1)	Diet quality	(41,42)
	Biology	Age (4)	Energy intake	(35–37)
			Dietary diversity of fruit and vegetables	(32)
			Fruit and vegetable consumption	(32)
			Dietary diversity	(39,40)
			Fattening product consumption	(30)
		Health (1)	Adequacy of food intake	(44)
	Socio-economic status	Socio-economic status (3)	Fruit and vegetable consumption	(31,32)
			Fruit and vegetable diversity	(31,32)
			Dietary diversity	(39,40)
			Dietary intake	(33)
		Employment (3)	Dietary diversity of fruit and vegetables	(32)
			Fruit and vegetable consumption	(32)
			Dietary diversity	(39,40)
			Fattening product consumption	(30)
		Education (3)	Fattening product consumption	(30)
			Dietary diversity	(39,40)
			Fruit and vegetable consumption	(31)
		Household food expenditure (1)	Dietary diversity	(39,40)
Social	–	Marital status (4)	Fattening product consumption	(30)
			Fruit and vegetable consumption	(32)
			Dietary diversity of fruit and vegetables	(32)
			Dietary diversity	(39,40)
			Fattening practices	(38)
		Household social roles (1)	Nutritional value of diet	(28)
			Snacking	(28)
		Household composition (1)	Food serving order	(28)
			Size of piece of meat	(28)
		What the rest of my family will eat (1)	Influence on food choice	(29)
		Number of children (1)	Dietary diversity of fruit and vegetables	(32)
			Fruit and vegetable consumption	(32)
		Attention/support in the household (1)	Dietary diversity	(39,40)
		Parental influence (1)	Adequacy of food intake	(44)
		Peers (1)	Adequacy of food intake	(44)
Physical	–	Household sanitation (1)	Dietary diversity	(39,40)
		Living area (modern/medina/precarious) (1)	Fruit and vegetable consumption	(32)
		Food availability (1)	Adequacy of food intake	(44)
		Eating outside of the home (2)	Fruit and vegetable consumption	(32)
			Dietary diversity	(39,40)
Macro	–	Cultural beliefs (2)	Adequacy of food intake	(44)
			Fattening practices	(38)
		Culture and religion (1)	Influence of food choice	(29)
		Religion (3)	Skipping breakfast	(34)
			Dietary diversity	(39,40)
			Adequacy of food intake	(44)
		Food prices (2)	Influence on food choice	(29)
			Adequacy of food intake	(44)
		Quality/freshness of food (1)	Influence on food choice	(29)
		Quick/easy-to-make foods (1)	Influence on food choice	(29)
		Presentation/packaging (1)	Influence on food choice	(29)
		Media (2)	Adequacy of food intake	(44)
			Purchasing of fast food	(43)

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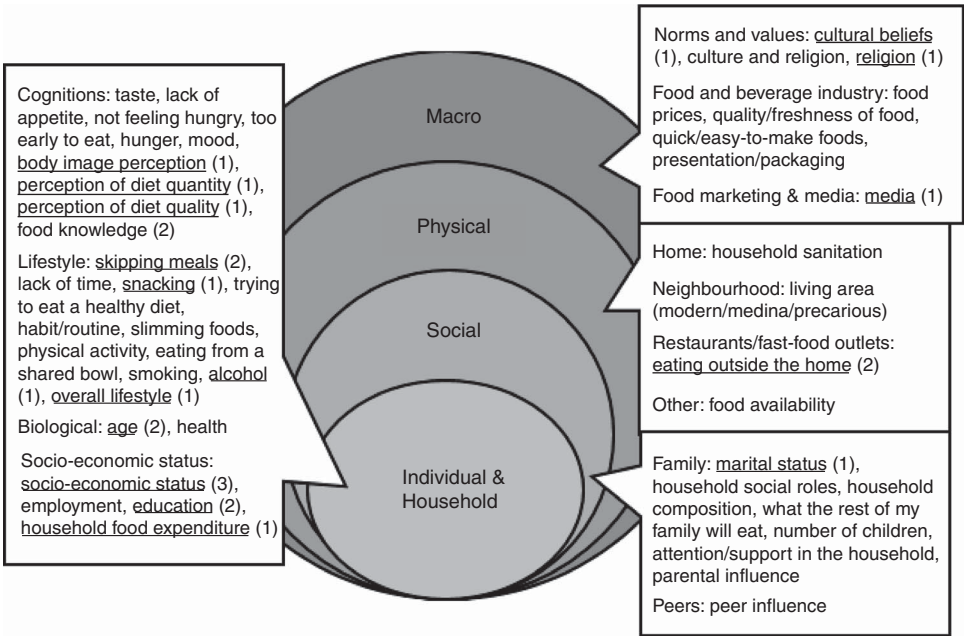

Fig. 2 Map of determinants of diet/dietary behaviour in women living in urban Africa (adapted from Story *et al.*[17]). Underlined determinants are those for which statistically significant results were reported; in parentheses are the numbers of studies finding these determinants significant

$P<0{\cdot}01$)[31]. One study from Burkina Faso found that dietary diversity was higher with a greater monthly household food expenditure ($\beta=6{\cdot}0$ (SE 0·14) for no expenditure *v.* $\beta=7{\cdot}0$ (SE 0·25) for expenditure >30 000 CFA francs, $P<0{\cdot}01$)[39,40].

Social-level determinants

Seven of the included studies investigated social-level determinants[29–31,33,39–41,45] (online supplementary material, Supplemental Table 4). Four studies investigated the relationship between marital status and dietary behaviour[30,32,38–40]. One found no difference in marital status and use of fattening products[30] and a second found no association with fruit and vegetable consumption or diversity[32]. Conversely, another study found that dietary diversity score was higher for single or married women compared with widowed/divorced women (6·7 for single, 6·3 for married and 5·8 for widowed/divorced women, $P=0{\cdot}01$)[39,40]. A qualitative study reported a fattening practice undertaken by Moroccan women of the Saharawi culture in preparation for marriage[38]. Another qualitative study found that married women ate diets of lower nutritional value than men[28]. Women reported to snack during food preparation, which the authors used to suggest how household social roles may influence energy intake[28]. In addition, that study looked at household composition, reporting that women were served in order of age and those with the highest status (e.g. mother-in-law) would get the largest piece of meat[28].

One study reported that 'what the rest of my family will eat' was rated by a majority as having a 'large influence' on food choice[29]. Number of children was not associated with fruit and vegetable consumption or diversity in another study[32]. One study created a 'Care for Women' index for the attention and support women receive from other household members, but this was not associated with dietary diversity[39,40]. Another study found no association between parental influence on food choice and self-reporting of food intake as 'adequate' or 'inadequate'[44]. One study reported that women who indicated that peers had a 'large influence' on their food intake were almost seven times more likely to self-report that their food intake was 'inadequate' instead of 'adequate' (OR = 6·54, 95 % CI 3·08, 13·89)[44].

Physical-level determinants

Three studies investigated the association between aspects of the physical environment and dietary behaviour[32,39,40,44] (online supplementary material, Supplemental Table 5). Household sanitation was found to have no association with dietary diversity[39,40]. One study looked at living area and found no association with fruit and vegetable intake[32]. No relationship was found between the influence of food availability on food choice and whether food intake was self-reported as 'adequate' or 'inadequate'[44].

One study found that women eating outside the home more often were significantly more likely to consume fewer vegetables[32]. However, another study found that eating outside the home was associated with higher dietary diversity compared with never eating outside the home (6·6 *v.* 6·0; $P<0{\cdot}01$)[39,40].

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Macro-level determinants

Six studies examined macro-level determinants of dietary behaviour[29,34,38–40,43,44] (online supplementary material, Supplemental Table 6). Two studies investigated cultural beliefs; one of which found that women stating that cultural beliefs affected their food intake were three times more likely to report an 'inadequate' food intake (OR = 3·07, 95 % CI 1·18, 7·99)[44]. A second study found that two-thirds of Saharawi women had used fattening practices and 71·4 % reported overfeeding at the time of the study[38]. The researchers cited an association of beauty with overweight as the motivation, as well as the cultural acceptance of unhealthy fattening practices[38].

In one study, culture and religion were said to have 'no influence' on food choice by a majority[29]. Of the three studies which looked at religion, one reported that 'religious reasons' had no association with skipping breakfast[34] or with dietary diversity in another study[39,40]. However, those who said that religious beliefs affected their food choice in a third study were more likely to report their food intake as 'inadequate' compared with 'adequate' (OR = 0·09, 95 % CI 0·03, 0·24)[44].

Two studies investigating food prices had contradictory findings: one found that price had no influence on whether food intake was self-reported as 'adequate' or 'inadequate'[44], and one reported that a majority said price had a 'large influence' on food choice[39].

One study investigating 'quality or freshness of food' and 'quick and easy to make foods' reported that most women said both had a 'large influence' on food choice[29]. The same study also found that presentation or packaging had a reportedly 'small influence' on food choice[29].

Two studies looked at the role of media[43,44]. One found that those who cited the media as affecting their food choice were more likely to report their food intake as 'inadequate' (OR = 0·12, 95 % CI 0·04, 0·32)[44]. One study which examined specific types of media found that 20·6 % of women said adverts on billboards, television, radio and flyers 'always' result in them buying fast food[43]; and 83·2 % said television adverts encouraged them to buy fast food[43].

Map of determinants

A visual map was constructed of all determinants of dietary behaviour in women living in urban Africa identified by the present review (Fig. 2), adapted from the ecological model of food environments which illustrates the interaction of the levels and the factors therein[17]. The present review identified additional factors not specifically mentioned in the model including mood, health, education and religion, representing potentially important areas for future research to prevent unhealthy dietary behaviours. In addition, there were also factors in the ecological model not identified by the current review presenting possible areas for future research: the influence of friends; physical environments such as worksites, fast-food outlets, childcare or stores; and macro-level determinants such as food/agriculture policy, government/politics, land use and transportation.

Discussion

The present systematic mapping review has identified and visually mapped determinants of dietary behaviour in women living in urban Africa from twelve included studies and six countries[28,29,31–44]. The majority of available research related to the individual and household levels. The primarily cross-sectional nature of the included studies makes determining causality challenging. However, some clear associations have been found between 'determinants' measured and certain dietary behaviours.

There was substantial heterogeneity between the settings, participants' age, determinants investigated and their measurement, and dietary behaviour assessed. Due to the wide age range of participants, it is reasonable to generalize the results to a similar age range of adult urban African women as focused on here (18–70 years). All income levels in Africa are represented by the included studies, giving the findings more generalizability. In terms of country, South Africa and Morocco were well represented in the available research and hence the findings can be reasonably applied to women in these contexts. However, generalizations to other African nations may be more challenging.

Notably, some study findings are based on self-reported beliefs and this subjectivity could have been influenced by interviewer bias, hence reducing the internal validity of the present review's findings.

It is important to note that the lack of research into determinants of dietary behaviour in this population makes significant evaluations with existing research challenging. The vast heterogeneity of determinants and tools used for measuring behaviour identified in the review furthers the difficulty in forming meaningful conclusions concerning specific determinants and their effects on particular dietary behaviours. However, ten of the seventeen determinants of dietary behaviour in women living in urban Africa are similar to those found in high-income countries[17]: perceptions, food knowledge, education, food expenditure, lifestyle, age, family (marital status), eating environments outside the home, culture and the media. It is therefore reasonable to suggest that many determinants of dietary behaviour are perhaps similar between urban Africa and high-income countries.

There is limited evidence available concerning some specific determinants influencing dietary behaviour identified in the current review in similar populations. The review found that higher SES was associated with greater consumption of 'Westernized' food (e.g. more fat- and sugar-rich and fewer traditional foods[33]), as well as increased diversity and fruit and vegetable consumption[32,39,40]. Interestingly, the review included a study reporting that knowledge had a relationship with

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inadequate protein intake, suggesting that food knowledge may actually be detrimental[44]. However, the sample used was specifically students at a single university aged 20–25 years who may not be representative of the target population of urban-dwelling adult women[45]. Moreover, a second study found that education positively influenced dietary diversity[39,40] and consumption of fattening products[30], and another found that its effect was modified by economic level[32]. Additionally, a fourth study included found a positive relationship between education level as a measure of SES and protein and fat consumption[46]. This corroborates the current review's findings by providing further evidence for the nutrition transition's occurrence in urban Africa and education/SES as determinants of such dietary changes. Second, included studies concerning food prices were contradictory[29,44]; however, a study found a significant reduction in consumption of foods high in salt and sugar, and an increase in consumption of fruit and vegetables and whole grains in South Africans if healthy foods were cheaper[47]. An economical modelling study also reported that a tax on sugar-sweetened beverages in South Africa would reduce consumption and hence reduce obesity[48]. Food price has the potential to influence food consumption and further research into this and other macro-level determinants is needed.

Conclusion

The findings from the present review identified seventeen determinants of diet and related behaviour in African women spanning all food environments, comprising the individual, social, physical and macro levels. Most of the available research in African settings related to individual and household food environments, and included determinants such as perceptions of body image and diet, food knowledge, meal skipping, snacking, alcohol consumption, healthier overall lifestyle, age, SES, education and food expenditure. Marital status, eating outside the home, culture, religion and the media were also found to affect dietary behaviour. There were numerous similarities between the identified determinants in this population and those found in high-income countries, which could represent effective target areas for prevention. The differences found could highlight factors specific to Africa, or represent areas of insufficient or non-existent research. The neglected areas of physical and macro-level environments indicate important areas of future investigation. Therefore, the review's findings could support context-specific interventions for preventing obesity and NR-NCD in African women.

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Supplementary material

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