

Food Insecurity and Aging: A Scoping Study of the Literature*

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RÉSUMÉ

Les publications sur l'insécurité alimentaire (IA) et le vieillissement sont limitées et dispersées parmi plusieurs disciplines, ce qui s'explique notamment par l'émergence récente des études sur la « faim » en général, et par les taux relativement faibles d'IA chez les personnes âgées. Le but de cet examen de la portée est de synthétiser et de caractériser la recherche en cours, en vue d'un examen plus critique de la question de l'insécurité alimentaire et du vieillissement. Des bases de données en sciences de la santé et en sciences sociales ont été consultées. La collecte des données comprenait l'examen et la caractérisation des contributions empiriques, méthodologiques et conceptuelles de chaque étude. Trente-huit études ont été sélectionnées à partir d'un échantillon initial comprenant 2041 titres. Différentes méthodes et opérationnalisations de l'IA et de l'âge ont été utilisées dans ces études. L'analyse thématique a révélé, à quelques exceptions près, une tendance continue à la biomédicalisation de la question de l'IA en lien avec le vieillissement. Ces résultats renforcent la pertinence du suivi de l'IA au niveau populationnel et de l'adoption de mesures standardisées. La problématique de l'IA et du vieillissement est un sujet stratégique pour une éventuelle analyse sociale critique.

ABSTRACT

Literature on food insecurity (FI) and aging is limited and scattered across disciplines, the reasons for which include the nascence of the study of "hunger" more generally, and relatively lower rates of FI among older people. This scoping review synthesized and characterized the current research to prompt a more critical examination of food insecurity and aging. Data extraction included reviewing and characterizing the empirical, methodological and conceptual contributions of each study, accessed from selected health sciences and social sciences databases. Thirty-eight studies were included from 2,041 titles. Different methods and operationalizations of FI and age were found to be used across studies. Thematic analysis revealed, with few exceptions, consistent tendencies towards the biomedicalization of the FI issue alongside aging. These findings reinforce the value of population-level monitoring of FI and uptake of standard measures. Moving forward, the issue of FI and aging is an opportune topic for critical social analysis.

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Introduction

Food insecurity,¹ defined as “limited or uncertain availability of nutritionally adequate and safe foods or uncertain ability to acquire acceptable foods in socially acceptable ways” (Anderson, 1990), is a relatively nascent but rapidly evolving field of research.

Over the past half century, food insecurity as a construct, a measure, and a defined public health issue has evolved from when early civil rights and anti-poverty activists first put “hunger” on the public and political radar in the United States (Poppendieck, 1998; Wunderlich & Norwood, 2006). Moral public outrage was also palpable in Canada around that time, during an era characterized by retraction of social security programs and social and welfare services (Poppendieck, 1998). Early qualitative researchers began to study hunger among low-income families, and started to conceptualize the phenomenon of food insecurity and the conditions that allow it to persist in industrialized countries (Radimer, Olson, Campbell, 1990). After a period of debate, the Household Food Security Survey Module (HFSSM) was created to capture different dimensions of the experience of food insecurity, including quantity, quality, and psychological and social acceptability (Anderson, 1990). Until the design of the HFSSM and its implementation in national population level surveys, the survey tools used to capture food insecurity were inconsistent and incomplete, resulting in incomparability across study contexts and no real “big picture” view of the scope or scale of the problem (Anderson, 1990; Radimer, 2002).

Since then, over the past few decades, food insecurity as an issue has been taken up by different groups of academic and government researchers, community food advocates, public health authorities, nutritionists, and medical physician groups. Accordingly, food insecurity has been explored and connected to a plethora of adverse immediate and long-term outcomes, including nutritional deficiencies, psychosocial consequences, and health outcomes, as well as environmental and socio-economic conditions (Gundersen & Ziliak, 2015; Gundersen & Ziliak, 2018).

However, the literature on food insecurity and aging continues to be limited, and this is likely in part due to the relatively lower rates of food insecurity among older people as compared to younger people (Che & Chen, 2001). Researchers point to public policy as the most important intervention level for food insecurity (Emery, Fleisch, McIntyre 2013a; McIntyre, Dutton, Kwok, & Emery, 2016; Tarasuk, Mitchell, Dachner, 2016). Indeed, food insecurity maps closely onto household income, and food insecurity rates are lowest in Organisation for Economic Co-operation and Development (OECD) countries with the strongest social welfare expenditures (Riches, 2018). And among those countries, the lowest

rates of food insecurity are experienced by older people, which is largely attributable to strong social entitlements for older people (McIntyre et al., 2016; Nord, 2002).

However, there are a number of justifications for investigating the issue of food insecurity among older people specifically. To begin with, some researchers have voiced concerns about measurement, and point to the complexity of food insecurity among older people and question the adequacy of the HFSSM, which was initially developed for younger populations (Radimer, Olson, Green, Campbell, & Habicht, 1992), to fully capture the phenomenon among older people (Quandt, Arcury, McDonald, Bell, & Vitolins 2001; Sahyoun & Basiotis, 2001).

Furthermore, of the limited research that does exist, much has been undertaken according to varied research traditions from the fields of nutrition, public health, economics, agriculture, and gerontology. Different fields of research are underpinned by differing epistemological assumptions. Exploring the same issue (food insecurity) from different paradigmatic positions has likely resulted in a fractured literature base without clear and cohesive research directions moving forward.

Additionally, the scarce research on food insecurity among older people that does exist arises from different national and political contexts. Research agendas are in part shaped by the differing political economies, normative cultures around aging and treatment of the aged, as well as the types of social assistance and food assistance that are in place in different countries. Differences in how food insecurity is defined and measured among older people present challenges in terms of comparing food insecurity among older people against a backdrop of changing demographic and social conditions, including aging populations alongside the hollowing out of social safety nets (Emery, Fleisch, & McIntyre 2013b; McIntyre & Rondeau, 2009). This scenario endangers the taken-for-granted low levels of food insecurity among older people.

Lastly, much of this research seems to be rooted in an orthodoxy fixated on old age as opposed to aging, that naturalizes old age decline. Food insecurity is a serious and urgent public health issue, and scholarship on aging has much to offer in terms of concepts and critiques to help better shape the research agenda on food insecurity moving forward.

The purpose of this study was to bring together the disparate literature concerning food insecurity among older people. Our research objectives were to (a) characterize the methodological, empirical, and conceptual contributions of each study; and to (b) thematically analyse the rationale and implications underpinning each study, as well as the conceptual

mechanisms hypothesized to connect aging to food insecurity. The goals of this research were to clarify some of the tendencies and contradictions of this broader literature as a whole, as well as to prompt more critical examination of the ways that aging is relevant to food insecurity research.

Methods

Methodological Approach

Considering the paucity of food insecurity literature pertaining to older people, we determined that a scoping study methodology, as described by Arksey and O'Malley (2005) and later refined by Levac, Colquhoun, and O'Brien (2010) and Colquhoun et al. (2014), would best allow us to address our above-described study aims and objectives. We did not set out to appraise the quality of individual studies, but rather sought to generate an overall picture of the gaps and limitations of the particular intersecting scholarship of food insecurity and aging (Armstrong, Hall, Doyle, & Waters, 2011).

Scoping studies are increasingly used for reviewing emerging evidence in which limited research makes it difficult to undertake a systematic review (Arksey & O'Malley, 2005), especially where an area is complex or has not previously been reviewed comprehensively (Mays, Pope, & Popay, 2005). We drew from the framework proposed by Arksey and O'Malley (2005) to give structure and rigour to the iterative and generative aspects of our methodology, including devising criteria post hoc alongside increasing familiarity with the literature. The stages initially proposed by Arksey and O'Malley (2005) formed the basis of the methodological framework for a scoping study, and included the following: (a) identifying the research question, (b) identifying relevant studies, (c) selecting the studies, (d) charting the data, (e) collating, summarizing, and reporting the results.

Identification of the Research Question

Food insecurity research pertaining to older people has not previously been reviewed. The research we undertook to examine food insecurity among older people derives from different fields of research, and thus, in the absence of previous reviews, and considering the scarcity and scattered nature of this research, we determined that the most appropriate elemental research question to begin with would be: *How is food insecurity being studied among older adults?* With this question, we were able to set more restrictive parameters for meeting our specific objectives once we gained a better sense of the broader literature.

Identification of Relevant Studies

We began in the fall of 2015 by collating a small selection of relevant studies. Preliminary searching of basic terms helped orient us with the literature and the contributing fields, as well as help us gain a better sense of the diversity of key search terms. We hand-searched the reference lists of each article from this early sample, and reviewed online publication lists of the most visible researchers. Next, we consulted with a research librarian to select relevant health sciences and social sciences databases and to confirm the appropriate search parameters for each database. These consultations led us to identify key journals (to be hand-searched), to establish a search strategy, and to develop an initial set of key search terms. Additionally, we searched the Cochrane online database for existing reviews on or related to the subject, whereby we discovered one protocol related to our topic which also helped to inform the search strategy (Burns et al., 2010). Early database searches and mining of reference lists led us to circle back to re-refine the search terms, and begin to devise inclusion and exclusion criteria.

Study Selection

Eligibility Criteria

Research studies were considered for inclusion if they prominently and predominantly focused on food insecurity and older people. The study population of "older" adults was conceptualized as being whatever age categories or thresholds researchers defined as being older. For studies that examined food insecurity across age categories, we included studies in our work if the older populations were prominently featured in the analyses and discussion. Because we sought to explore the issue more broadly, we included only studies that examined food insecurity among non-institutionalized older people. Studies that used food insecurity as a variable, or determinant of another health outcome, and did not discuss the possible determinants of food insecurity or mechanisms through which food insecurity leads to that outcome, were not included.

Studies that exclusively studied rural food insecurity were not included, as these studies tended to focus on the unique aspects of food insecurity specific to rural settings. Due to the differing nature and experiences of food systems in developing countries, we considered only those studies that examined food insecurity in developed (or more-developed countries). To establish the current state of the scholarship with respect to our research question overall, we limited search returns to peer-reviewed journal articles. These could include qualitative or quantitative methods, and observational, experimental, or literature review studies. Accordingly,

the following documents were not included in the review: conference abstracts, letters, commentaries, editorials, or theses.

Search Strategy and Identification of Studies

The following selection of social sciences and health sciences databases were accessed from May to July 2016: CINAHL, EMBASE, ProQuest Central, Web of Science, IBSS (International Bibliography of the Social Sciences), HealthSTAR, GEOBASE, MEDLINE, OVID, and Scholars Portal.

We searched the databases independently by key terms as well as subject headings. Note that variants and wild card truncations were also used. Wherever possible, we placed search parameters on the databases to limit searches to (a) human populations, (b) English language, (c) journal articles, (d) peer-reviewed studies, (e) urban settings, and (f) age limits (older than age 60 or 65 years). Subject headings included food security or food insecurity, as some databases differentiated with relevant content between these two concepts. We developed key search terms to describe the issue of food insecurity (food security, food insecurity, food-related hardship, food access, food environment, food insufficiency) and the population (elderly, older, senior, aged).

The reviewer protocol was generative and iterative. We independently searched each database by key search terms and subject headings. Afterward, we reconvened to compare numbers and a sample of titles to confirm their exclusion frames.

Next, we combined titles and removed duplicates. Any discrepancies in titles were discussed to ensure consistency and exhaustiveness of the initial catchment. During the second stage, we reviewed abstracts and included them if older adults were a main focus of the research study and prominently focused in the methods and findings of the study. We found that when studies lacked a clear focus on older people (i.e., if, in the methods, age groups were collapsed) that the findings were not differentiated between age groups and thus there was very little consideration of age with respect to the broader inquiry. Additionally, we excluded abstracts if they did not satisfy the initial search parameters (due to differing capabilities of each database). For example, many studies were excluded due to the same spelling of aged: "aged 4–9 years old" versus aged as in "people who are aged". During the third stage, we each reviewed sets of the full-text articles and subsequently discussed the broader collection of studies.

In reading the whole article, we decided to exclude studies that focused on program evaluation or cost-comparison of community-based food programs and

services for older adults. We made this decision because we found these studies to examine food insecurity among older people in an indirect or secondary way and offered few insights into the relevance of aging to food insecurity as an issue. Similarly, there were a few studies that inexplicably examined food insecurity as a mediator or moderator of another health outcome, and for the same reasons, we excluded those at this point as well.

Charting the Data

The data extraction was a two-stage approach – descriptive and analytic – to characterize the collection of studies. To begin, each study was described according to methodological, empirical, and conceptual contributions. Methodologies were described according to research approach, sample size, study design, food insecurity measurement, and age definition. Empirical contributions were condensed to include the main findings of the research study, including qualitative themes, for example, or positive, negative, or null relationships relating to food insecurity. Next, we more closely examined the conceptual contributions. Studies were gleaned for theoretical frameworks, references to theory, conceptual models, and explicit or hypothetical mechanisms for how food insecurity might relate to aging. Additionally, we pulled the stated study rationale and research implications from each study, from introduction sections, and introduction and discussion sections respectively. Separate spreadsheets were maintained for each of the ways that studies were described (methodological, empirical, conceptual), were organized in tabular form, and from there we distilled them to form the basis of the analytic stage of this study.

Collating, Summarizing, Reporting the Results

Different disciplines have different philosophical paradigms, and taken-for-granted ontological, epistemological axiological and methodological assumptions. Because the literature on food insecurity and aging has been taken up by various disciplines, it was important for us to acknowledge the potential differences in cultures of inquiry from which our collection of studies was drawn. Therefore, we found it prudent to tackle our guiding research question using qualitative synthesis, to "create a product that is more than the sum of its parts" (Barnett-Page & Thomas, 2009). We determined that thematic analysis would best allow us to offer a coherent synthesis of the current state of the literature (Thomas & Harden, 2008), to more fundamentally address the research question *how is food insecurity being studied among older people*. We used rationale, implications, and implicitly or explicitly stated mechanisms connecting aging to food insecurity to serve as evidence of philosophical assumptions underlying the research

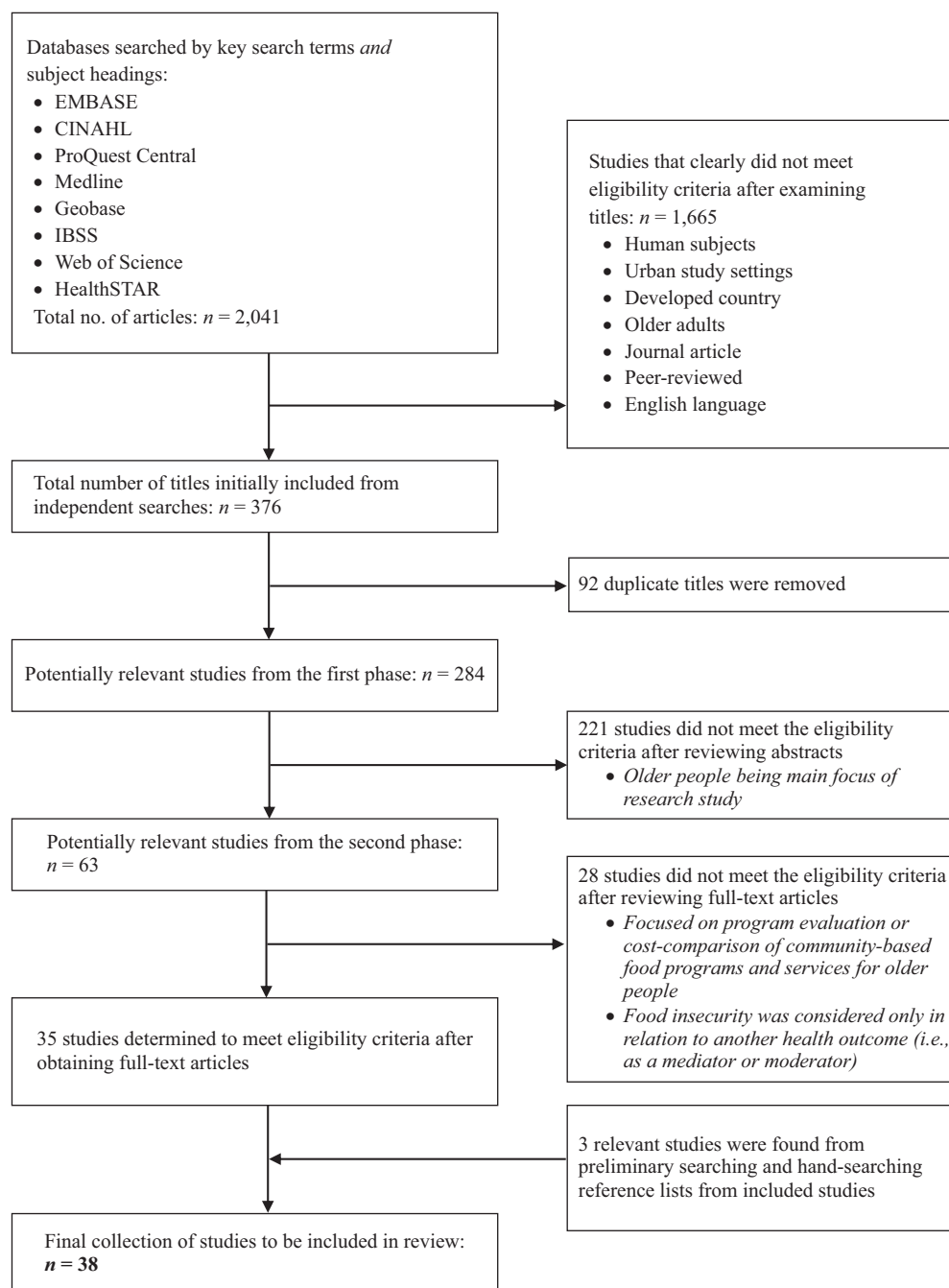


Figure 1: Search results flowchart

inquiry of each study. Close reading and re-reading of the study rationale, research implications, and hypothetical mechanisms rendered a selection of relevant text fragments. Constant comparison of these fragments within the articles, and organization into a table, allowed for them to remain connected to the original manuscript context. Thematic analysis of this content was performed, whereby we grouped text fragments into sub-themes, which were then constructed into themes (Thomas & Harden, 2008).

Results

Collection of Studies

Database searching yielded an initial catchment of 2,041 potential articles. Of these, 35 studies met the eligibility criteria (Figure 1). Three additional studies that were included in the final review collection resulted from preliminary searching and hand-searching reference lists. Inter-rater reliability of the initial titles to the final collection of studies was calculated as Cohen's Kappa

coefficient ($Kappa = 0.699$, $SE: 0.051$). Studies were described by title, study location, research method, main study findings directly pertaining to food insecurity and older people, and theoretical references (Table 1).

Characterization of Study Collection

All studies were conducted from the year 1996 to 2016. Study location was a decidedly relevant detail, as national context gives insight into the different social policies and programs that impact food security into older ages at a population and individual level. Twenty-eight of the studies were conducted in the United States; six, in Australia; three, in Canada; and one was conducted in the United Kingdom. Twenty-nine studies were conducted using a quantitative approach, eight studies used qualitative methods, and one study employed mixed methods.

Although most studies examined food security and older people more broadly, some studies, which tended to be smaller scale and/or employ qualitative methods, exclusively focused on the particular vulnerability of sub-groups of older people, including low-income (Emery et al., 2013b; Green-LaPierre et al., 2012; Guthrie & Lin, 2002; Johnson, Sharkey, & Dean, 2011; Keller, Dwyer, Senson, Edwards, & Edward, 2006; Nord & Kantor, 2006; Pierce, Sheehan, & Ferris, 2002), gender (Green-LaPierre et al., 2012; Klesges et al., 2001; Pierce et al., 2002), race (or culture) (Radermacher, Feldman, & Bird, 2010a; Radermacher, Feldman, Lorains, & Bird, 2010b; Sharkey & Schoenberg, 2005), disability (Brewer, Catlett, Porter, Lee, & Hausman, 2010; Klesges et al., 2001; Lee & Frongillo, 2001), chronic disease status (Brewer et al., 2010; Sharkey, 2005), being homebound (Sharkey, 2005; Sharkey & Schoenberg, 2005), and living alone (Quine & Morrell, 2005). Study findings mainly pertained to individual, interpersonal, and environmental risk factors or predictors of food insecurity among older people. Many of the observational studies reported varying prevalence rates of food insecurity within their respective study populations (Fitzpatrick, Greenhalgh-Stanley, & Ver Ploeg, 2015; Russell, Flood, Yeatman, & Mitchell, 2014; Woltil, 2012).

Despite such procedural differences, there was consistency in co-variables used across studies. Analyses tended to concentrate on individual-level variables, with an overall emphasis on socio-demographic factors: age, gender, ethnicity, education, marital status, income level, source of income, housing tenure, and living arrangements. There was also considerable focus on the role of social support in sustaining food security for older people (Chung et al., 2011; Frongillo, Valois, & Wolfe, 2003; Green-LaPierre et al., 2012; Keller et al.,

2006; Pierce et al., 2002; Radermacher et al., 2010b; Woltil, 2012).

The methods of eight studies, including three quantitative and five qualitative studies, centred on the importance of examining the relationship between food insecurity and other factors longitudinally (Alley et al., 2009; Bhargava & Lee, 2016; Bhargava, Lee, Jain, Johnson, & Brown, 2012; Fitzpatrick et al., 2015; Frongillo et al., 2003; Green-LaPierre et al., 2012; Russell, Flood, Yeatman Wang, & Mitchell, 2016; Sattler & Lee, 2013; Sharkey, 2005). Other studies made use of cross-sectional data, while citing the importance of understanding the direction and the dynamics of the relationship between food insecurity and aging (Bengle et al., 2010; Brewer et al., 2010; Goldberg & Mawn, 2014; Klesges et al., 2001; Sharkey, 2004; Sharkey, 2005; Temple, 2006). For example, Goldberg & Mawn (2014) suggested that longitudinal studies would be useful in examining the relationships between cause and effect of the predictors of food insecurity among older people, which could then inform intervention studies designed to target groups and sub-groups at highest risk of food insecurity. Klesges et al. (2001) examined potential relationships between food insufficiency and poor health and well-being among elderly disabled women, but called for longitudinal data to ascertain the role of financial difficulty of their acquiring food.

Upon closer examination of methodologies, differences in terminology and definitions of food insecurity were found between studies (Table 2). Although many studies employed the 1998 Life Sciences Research Office definition for food insecurity, or some shortened variations thereof, several studies used related terminology – food and material hardship, food insufficiency, food disadvantage, nutrition insecurity, food adequacy, food access – interchangeably with food insecurity and alongside food insecurity measures. Most common measures of food insecurity included the full-version and modified versions of the U.S. Household Food Security Survey Module (U.S. HFSSM). Some researchers included measures that were adapted to better capture the unique experience of food insecurity among older people (for example, age-related factors such as physical access to food stores, or physical limitations in preparing and cooking meals).

Other researchers employed combinations of food insecurity measures, both of which introduced variability in terms of thresholds for severity of food insecurity that were found to be very consistent across studies that employed the standard versions of the U.S. HFSSM.

Many researchers were able to base their inquiries on large, rich, and existing data sets that included these validated versions of the U.S. HFSSM (i.e., NHANES, Current Population Survey, National Health Interview

Table 1: Overview of studies included in the current review (each study was described by methodological approach, main findings [+ : relationship found. - : no relationship found. 'o': inconclusive relationship. 'rr' = reported rate], and theoretical references or frameworks)

Study	Title	Location	Methods	Main Findings	Theoretical References
Afulani et al., 2015	Food insecurity (FI) and health outcomes among older people: the role of cost-related medication underuse	USA	Quantitative (cross-sectional – logistic regression)	+ FI associated with cost-related medication underuse (relationship differs for women, by chronic disease status, type of health insurance)	
Ahn et al., 2014	Associations of FI with body mass index among baby boomers and older people	Texas, USA	Quantitative (cross-sectional – logistic regression)	+ Obesity, baby boomer age, female, African American or Hispanic, lower income, greater depression, not meeting fruit and vegetable intake (FVI) or physical activity (PA) recommendations	
Alley et al., 2009	Material resources and population health: disadvantages in health care, housing, and food among adults over 50 years of age	USA	Quantitative (longitudinal – logistic regression)	+ Material disadvantage (women, race/ethnicity, education), differences between older (65+ and younger (51–64) in health care and food disadvantage; overall higher rates of worsening health among people without adequate material resources	Life-course model
Bengle et al., 2010	FI associated with cost-related medication non-adherence in community-dwelling, low-income older people in Georgia	Georgia, USA	Quantitative (cross-sectional – logistic regression)	+ FI associated with cost-related nutrition medication non-adherence (younger-old, female, African American)	
Bhargava et al., 2012	FI negatively associated with home health and out-of-pocket expenditures in older people	Georgia, USA	Quantitative (cross-sectional + longitudinal – logistic regression)	+ Poor, female, nonwhite, greater burden of poorer health; FI had lower Medicare and out-of-pocket expenditures	
Bhargava & Sun Lee, 2016	FI and health care utilization among older adults	Georgia, USA	Quantitative (cross-sectional – logistic regression)	+ Comparable utilization of all types of health care services comparable among food security (FS) and FI (when various demographic, socio-economic, health insurance, and health status factors held constant)	Anderson's framework of health care access and utilization; Neoclassical household production framework
Brewer et al., 2010	Physical limitations contribute to FI and the FI-obesity paradox in older people at senior centres in Georgia	Georgia, USA	Quantitative (cross-sectional – logistic regression)	+ Obesity related and physical-limitation-related measures (except physical function), African American, high waist circumference, reporting weight-related disability	Conceptual model for FI-obesity paradox; Disablement process (extension of Nagi model)
Chung et al., 2011	Linking neighbourhood characteristics to FI in older people: the role of perceived safety, social cohesion, and walkability	New York City, USA	Quantitative (cross-sectional – logistic regression)	+ Lower income, more depressive symptoms – neighbourhood walkability o: neighbourhood social cohesion	
Deeming, 2011	Food and nutrition security at risk in later life: evidence from the United Kingdom Expenditure & Food Survey	United Kingdom	Quantitative (cross-sectional – logistic regression)	+ Low-income households, oldest-old, elderly from Black and minority ethnic groups, disability, men living alone	
Emery et al., 2013b	Legislated changes to federal pension income in Canada will adversely affect low-income seniors' health	Canada	Quantitative (cross-sectional – logistic regression)	– Old age among vulnerable population groups (equivalent to receiving main source of personal income from federal seniors' benefits)	
Fitzpatrick et al., 2015	The impact of food deserts on food insufficiency and SNAP participation among the elderly	USA	Quantitative (cross-sectional + longitudinal – fixed effects regression)	+ Living in food desert without a vehicle (impacts participation in subsidized meal programs)	

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Table 1: Continued

Study	Title	Location	Methods	Main Findings	Theoretical References
Frongillo et al., 2003	Using a concurrent events approach to understand social support and FI among elders	New York, USA	Qualitative (longitudinal – concurrent events approach)	“Monthly cycle” of FI; importance of food exchange as a source of social and food support	
Goldberg et al., 2014	Predictors of FI among older people in the United States	USA	Quantitative (retrospective cross-sectional – logistic regression)	+ Marital status, race and ethnicity, educational attainment, severity of depression, not having help with financial support, private insurance coverage, having received household food stamp benefits	Social ecological model
Green-LaPierre et al., 2012	Learning from “Knocks in Life”: FI among low-income lone senior women	Nova Scotia, Canada	Qualitative (semi-structured face-to-face interviews – phenomenological approach)	Self-perceived FI status is heavily impacted by world view (resilient self-sufficiency); increasing reliance on others; suffering of social life	
Guthrie et al., 2002	Overview of the diets of lower- and higher-income elderly and their food assistance options	USA	Quantitative (cross-sectional – logistic regression)	+ Lower-income elderly consume fewer calories, fewer servings of major food pyramid food groups, and most nutrients; gender, education, age (oldest-old), eating alone, supplement use, disability, living in a central city or in southern region of USA, African American background	
Johnson et al., 2011	Indicators of material hardship and depressive symptoms among homebound older people living in North Carolina	North Carolina, USA	Quantitative (cross-sectional – logistic regression)	+ Age (relatively younger: 60–74 years) and reporting food-related indicators of material hardship were associated with symptoms of depression; food-related hardship most strongly associated with health	
Keller et al., 2006	A social ecological perspective of the influential factors for food access described by low-income seniors	Ontario, Canada	Qualitative (semi-structured interviews)	Interplay of ecological factors on FI; food compromise rather than food insufficiency predominated	Social ecological model; Model of the disablement process
Klesges et al., 2001	Financial difficulty in acquiring food among elder disabled women: results from the Women’s Health and Aging Study	Baltimore, USA	Quantitative (cross-sectional – logistic regression)	+ Financial difficulty acquiring food highly prevalent in cognitively intact, community-dwelling, older, disabled women; difficulties with food insufficiency exacerbated for non-White women; depression, anemia, gait speed (White), health status (non-White) were also associated with financial difficulty acquiring food	Wolfe’s conceptual framework of FI among the elderly
Nord, 2003	Measuring FS of elderly persons	USA	Quantitative (scaling methods – Rasch model)	Response patterns and dispersion scores suggest a greater consistency in the way elderly people experience and manage FI; May also indicate more consistent understanding of questions	
Nord & Kantor, 2006	Seasonal variation in FI is associated with heating and cooling costs among low-income elderly Americans	USA	Quantitative (cross-sectional – logistic regression)	+ Households with incomes below poverty line (in high-heating states during winter, and in high-cooling states in summer)	
Pierce et al., 2002	Nutrition concerns of low-income elderly women and related social support	USA	Qualitative (focus groups, in-depth, open ended interviews – interpretivist approach, content analysis)	Most common concern: high cost of food (vs. limited income). Adequate diet is redefined towards end of month (fewer items, lower quality). Other barriers: transportation, diet modifications, difficulty shopping and preparing foods due to disability, mental health issues. Support: instrumental types most important	

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Table 1: Continued

Study	Title	Location	Methods	Main Findings	Theoretical References
Quine, 2005	FI in community-dwelling older Australians	New South Wales, Australia	Quantitative (cross-sectional – logistic regression)	+ Poor self-rated health (men), lifestyle (women), financial difficulties (particularly among older women), non-home ownership	
Radermacher et al., 2010a	FS in older Australians from different cultural background	Victoria, Australia	Mixed methods (cross-sectional – descriptives, chi-square; focus groups – thematic analysis)	FS among elders extends beyond physical and economic access; cost, changes to physical health, compounded by living in remote geographic locations with poor public transport systems	Dowler's model of FI (reference)
Radermacher et al., 2010b	Exploring the role of family and older people's access to food in different cultures: Will the children be there to help?	Victoria, Australia	Qualitative (focus groups – thematic analysis)	Three themes: children's roles and responsibilities, reciprocity and intergenerational exchange, changing roles and expectations of family	
Russell et al., 2016	FI and poor diet quality are associated with reduced quality of life in older people	Sydney, Australia	Quantitative (longitudinal cohort – stepwise regression, MANCOVA)	+ FI and poor diet associated with reduced health-related quality of life	
Russell, 2014	Prevalence and risk factors of FI among a cohort of older Australians	Sydney, Australia	Quantitative (cross-sectional – logistic regression)	+ Age (49–70 years), gender (female), home ownership (rental accommodations), obesity status, poor self-rated health, walking disability, two or more conditions of poor health, receipt of a pension only, smoking status	
Sattler & Sun Lee, 2013	Persistent FI is associated with higher levels of cost-related medication non-adherence in low-income older people	Georgia, USA	Quantitative (longitudinal – ordinal logistic regression)	+ Cost-related medication non-adherence, more health problems	
Shannon et al., 2015	Evaluating the relationship between urban environment and food security in Georgia's older population	Georgia, USA	Quantitative (cross-sectional – logistic regression)	+ Urban form (core urban areas and urban clusters)	
Sharkey, 2004	Nutrition risk screening: the interrelationship of FI, food intake, and unintentional weight change among homebound elders	Texas, USA	Quantitative (cross-sectional – logistic regression)	+ FI homebound elders more likely to report nutritional health risk factors and indicators of nutritional risk (illness, medications, oral condition, living alone), but not physical indicator (unable to shop, cook, or feed oneself)	Conceptual model for nutritional health risk factors and indicators
Sharkey, 2005	Longitudinal examination of homebound older people who experience heightened food insufficiency: effect of diabetes status and implications for service provision	North Carolina, USA	Quantitative (logistic regression)	+ Diabetes status progressively increased odds for risk of being FI or FS; progression occurred despite intervening events or inadequacy of economic resources (i.e., receipt of home-delivered meals)	Economic context model
Sharkey & Schoenberg, 2005	Prospective study of Black-White differences in food insufficiency among homebound elders	North Carolina, USA	Quantitative (longitudinal – logistic regression)	+ Black vs. White racial disparities in food sufficiency status that increased over 1 year's time (despite receipt of home-delivered meals) – explanatory variables suggest increased medication use (accompanied by reduction in medication coverage and increase in out-of-pocket medication expense)	Bronfenbrenner's ecological systems theory

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Table 1: Continued

Study	Title	Location	Methods	Main Findings	Theoretical References
Sun Lee et al., 2001	Factors associated with FI among U.S. elderly persons: importance of functional impairments	USA	Quantitative (cross-sectional – logistic regression)	+ Functional impairments, socio-demographic variables (significant risk factors tend to occur simultaneously and place subgroups at much higher risk)	
Sun Lee et al., 2011	Nutrition and health consequences are associated with FI among U.S. elderly persons	USA	Quantitative (cross-sectional – logistic and linear regression)	+ Lower nutrient intakes, lower skinfold thickness measures, poorer nutritional and health status	
Temple, 2006	FI among older Australians: prevalence, correlates, and well-being	Australia	Quantitative (cross-sectional – logistic regression)	+ Living arrangements (resources, socially based difficulties), health conditions (mobility-associated challenges with food preparation and access, purchasing health insurance)	
Wolfe et al., 2003	Understanding the experience of FI by elders suggests ways to improve its measurement	New York, USA	Qualitative (in-depth interviews, 6 months apart – open coded, grounded theory)	Ten themes (FI): lack of money, transportation limitations, health or mobility limitations, not the right foods for health (including dietary requirements), financial priorities, food compromises, strategies for accessing food, lack of motivation to cook or eat, perception of adequate food for health, worry/ anxiety about food situation	Conceptualization of the experience of FI among older people
Wolfe et al., 1998	Hunger and FI in the elderly: its nature and measurement	New York, USA	Qualitative (interview – naturalistic inquiry)	Progression of severity consistent among elderly, but anxiety around compromised diet different due to health problems and medical conditions; intra-household vs. out-of-household coping strategies also different among elders; further testing and methodological research possibly needed	Conceptualization of the progression of FI
Wolfe et al., 1996	Understanding FI in the elderly population: a conceptual framework	New York, USA	Qualitative (interview – naturalistic inquiry)	Conceptual framework confirmed previously identified factors – health problems, limited resources, living situation – in addition to food management skills, community characteristics, availability of family members (and how these factors interrelate)	Conceptual model of comprehensive factors that influence FI among older people
Woltl, 2012	The impact of emotional social support on elders' FS	USA	Quantitative (cross-sectional – logistic regression)	+ Mexican American background – Self-reported receipt of emotional support, higher household income, marital status	

FI = food insecurity; FS = food security; FVI = fruit and vegetable intake; PA = physical activity; SNAP = Supplemental Nutrition Assistance Program

Survey in the United States, and in Canada, the Canadian Community Health Survey). Because Australia does not formally monitor food insecurity, the studies coming out of Australia had the most limited consistency in food insecurity definition and instrumentation. There was variability across studies in terms of the reference period of the measurement, with some measures asking survey respondents to report on their food insecurity over the past 2 years, 12 months, 6 months, or 30 days, and other studies not indicating the reference period.

There was considerable variability in how old age was operationalized. Although many studies defined old age as being 55, 60, or 65 years of age and older, some included study populations as young as 49 years (Russell et al., 2014; Russell et al., 2016), while another study defined old age as being age 75 years and older (Pierce et al., 2002). Official retirement age, and age-defined eligibility for pensions and old age supports, likely make different age cutoffs more relevant depending upon the national context. However, very few studies offered any justification or explanation for their particular definition of “old”. The qualitative studies in the current collection included between eight to 46 study participants, and used different approaches to addressing research inquiries, including grounded theory, naturalistic inquiry, phenomenological approaches, and interpretivist approaches.

About a third of the studies made theoretical references or offered unique conceptual or theorization to this area of inquiry. The studies that centrally featured a theoretical or conceptualization of food insecurity, whether uniquely presented in that study or drawn from previous literature, were summarized according to their conceptual contribution to this area of research.

Thematic Analysis

Although many studies did not offer a theoretical framework, some outlined conceptual mechanisms. These mechanisms that were implicitly or explicitly used to explain the relevance of food insecurity and aging are presented in Table 3.

Major themes that emerged from these explanatory mechanisms were as follows: aging, life course, geography, living arrangement, social-relational, subgroup disadvantage, gender, race/ethnicity, income, health, disability, chronic illness, and behaviour. For example, with respect to the theme of aging, sub-themes of complexity, aging process, and physical/cognitive/physiological differences were used to conceptually connect aging to food insecurity. Some researchers pointed to the complexities that aging introduces to issues of food insecurity (i.e., co-existence of functional impairments, social isolation, adverse effects of

multiple medications, depression, limited access to resources, challenges in local food environment), whereas other researchers placed more emphasis on age as a process that renders increasing vulnerability with time (i.e., increasing reliance on others, with age; the onset of physical, physiological, and social changes that impede the ability to obtain and prepare optimal meals). Other researchers took on yet a more comparative stance with respect to age, where they contrasted vulnerability of food insecurity among older people as compared to younger people (i.e., food insecurity may be less prevalent among older people, but the health consequences may be more serious; dietary vulnerability and malnutrition is of greater concern among older people).

We also found several contradictions between sub-themes within broader themes. For example, with respect to income, fixed income and government concessions and income supports were proposed to be detrimental in some studies and protective in others. Similarly, with respect to the life course for older people, cumulative disadvantage was used to explain age-related vulnerability in some studies, whereas resilience, coping skills, resourcefulness, past experiences, and generational lens were proposed to be protective against food insecurity for older people in others. There was also a subset of mechanisms that were directed towards explaining the potential under-detection of food insecurity among older people, including selectivity bias, phenomenological difference, and reporting bias (Table 4). These mechanisms offer three main explanations as to how food insecurity may artificially appear to be lower among older people as compared to younger populations; namely, that the people being sampled may be biased towards some sort of healthy survivor effect (selectivity bias), or that older people may have different reporting tendencies (reporting bias). The other explanation is that food insecurity is experienced or perceived differently by older people as compared to younger people, and thus is not accurately captured using current survey instruments (phenomenological differences).

Rationale and implications of each study were also examined (Table 5). Thematic analysis of the rationale from these studies mapped onto ecological levels: individual, interpersonal, and societal (Table 6). The ways that food insecurity among older people was problematized on a societal level mainly involved expenditures and economic consequence, with very few references to social loss framed as social inequality. One theme that threaded through all three levels was food insecurity and aging as it related to health, whereby the emphasis was on the problem of health decline as a burden individually (adverse health outcomes), interpersonally (caregiver burden), and societally (increased health care

Table 2: Overview of methodological approaches in the current collection of studies (studies are methodologically described by data set, sample size, study design, methodological approach, food insecurity study instrument or definition, and definition of age)

Study	Data Set (sample size)	FI Definition	FI Instrument ^a	FI Operationalization	Age Definition (years)
Quantitative Studies					
Afulani et al., 2015	2011, 2012 National Health Interview Survey (NHIS) (10,401)	FI = limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways	10-item U.S. Adult Food Security Survey Module (30-day reference period)	High FS, Marginal FS, Low FS, Very low FS; FI = "low FS, very low FS"	65+
Ahn et al., 2014	Brazos Valley Health Survey (2,985)	FI (<i>no definition given</i>)	Modified 6-item U.S. Household Food Security Survey Module (12-month reference period)	FS summary score: FS = 0-1; FI = 2-6	60+
Alley et al., 2009	Health and Retirement Survey – 2004, 2006 (15,441)	Food disadvantage (<i>no definition given</i>)	2 items (2-year reference period): i) Have you always had enough money to buy the food you need? ii) Has anyone in the household received government food stamps at any time?	Food insufficiency = negative response to first question	51+
Bengle et al., 2010	Older Americans Act Nutrition Program participants (1,000)	FI (<i>see above</i>)	Modified 6-item U.S. Household Food Security Survey Module (30-day reference period)	FS summary score: FS = 0-1; FI = 2-6	60-90
Bhargava et al., 2012	Georgia Advanced Performance Outcomes Measures Project 6-Centres for Medicare and Medicaid (903)	FI (<i>no definition given</i>)	Modified 6-item U.S. Household Food Security Survey Module (30-day reference period)	FS summary score: FS = 0-1; FI = 2-6	65+
Bhargava & Sun Lee, 2016	Georgia Advanced Performance Outcomes Measures Project 6-Centres for Medicare and Medicaid (957)	FI (<i>see above</i>)	Modified 6-item U.S. Household Food Security Survey Module (30-day reference period)	FS summary score: FS = 0-1; FI = 2-6	65+
Brewer et al., 2010	621	FI (<i>see above</i>)	Original 6-item U.S. Household FI Survey Module	FS summary score: FS = 0-1; FI = 2-6	50+
Chung et al., 2011	2008 Health Indicators Project (1,650)	FI = "limited access to nutritionally adequate foods"	3 binary measures of FI: i) In the past 30 days, have you been concerned about having enough to eat? ii) In the past 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food? iii) In the past 12 months, were you hungry, but did not eat because you weren't able to get out to buy food?	FI = yes; FS = no	60+

Continued

Table 2: Continued

Study	Data Set (sample size)	FI Definition	FI Instrument ^a	FI Operationalization	Age Definition (years)
Deeming, 2011	5,600 older households	FI (<i>see above</i>); Nutrition insecurity = "failure to meet recommended dietary guidelines"	Dietary Reference Values (DRVs) used to assess the nutritional adequacy of household diet (2-week survey period) based on referent nutrient and energy intakes	Food nutrition secure = meeting dietary standard; Food nutrition insecure = not meeting dietary household	55+
Emery et al., 2013b	Canadian Community Health Survey – Cycle 4.1 (151,350 + 151,485)	FI = inadequate or insecure access to adequate food due to financial constraints; a concept of risk arising from economic insecurity that is broader than the experience of going without food or adequate food	10-item U.S. Adult Food Security Survey Module (12-month reference period)	FS = 0–1 affirmed responses; FI, Moderate = 2–5 affirmed responses; FI, Severe = ≥ 6 affirmed responses	60–64, 65+
Fitzpatrick et al., 2015	2006, 2010 Health and Retirement Study (no. not stated)	Food and material hardship (<i>no definition given</i>)	Food and material hardship reported experiencing at any time in the past 2 years: food insufficiency, skipped meals, skipped prescription drugs	Food insufficiency = if anyone in the household was unable to purchase enough food due to lack of financial resources	60+
Goldberg & Mawn, 2014	2007–2008 NHANES (2,045)	FI (<i>see above</i>)	10-item U.S. Adult Household FS Survey Module (12-month reference period)	FS = household with ≤ 2 affirmative responses FI = household with ≥ 3 affirmative responses	60+
Guthrie & Lin, 2002	1999 Current Population Survey (U.S. Census Bureau) + Continuing Survey of Food Intakes by Individuals (U.S. Department of Agriculture); 3,150	FS = "state in which all persons obtain nutritionally adequate, culturally acceptable, safe food regularly through local non-emergency sources"	18-item U.S. Household Food Security Survey Module (12-month reference period)	FS FI without hunger FI with hunger	60+
Johnson et al., 2011	345	Material hardship = "alternate conceptualization of poverty based on material living conditions, food and nutrient consumption, and health care utilization"; Food insufficiency, FI, and hunger were cited as a potential condition of material disadvantage (<i>no definitions given</i>)	Absence of food (6-month reference period): i) Were there days when there was no food in the house and no money for food? ii) Were there days when you skipped meals because there was no food in the house, or you thought you might not have enough food? Forced resource allocation (6-month reference period): i) Were there days when you had to choose between buying food and buying medication? ii) Were there days when you had to choose between buying food and paying bills?	FS = "no" response to all of the 4 items; Risk of FI = "no" to absence of food items, but "yes" to either forced resource allocation items; FI = "yes" to either absence of food items	60+

Continued

Table 2: Continued

Study	Data Set (sample size)	FI Definition	FI Instrument ^a	FI Operationalization	Age Definition (years)
Klesges et al., 2001	Women's Health and Aging Study (1002)	Financial difficulty acquiring food, Food insufficiency (<i>no definitions given</i>); FI (<i>see above</i>)	Food access as 1 item: "How often does it happen that you (and your husband) do not have enough money to afford the kind of food you should have?"	Responses dichotomized; financial difficulty acquiring food = positive response; no financial difficulty acquiring food = negative response	65+
Nord, 2003	Current Population Survey, 1998–2000 (7,072 elderly-only households, 14,524 nonelderly households)	FS (<i>see above</i>)	18-item U.S. Food Security Scale (12-month reference period) Food sufficiency item: Which of these statements best describes the food eaten in your household: Enough of the kinds of food we want to eat Enough but not always the kinds of food we want to eat (if yes, possible reasons – yes/no): • Not enough money for food • Kinds of food we want not available • Not enough time for shopping or cooking • On a special diet Sometimes not enough to eat Often not enough to eat (if yes to this or previous question, possible reasons – yes/no): • Not enough money for food • Not enough time for shopping or cooking • Too hard to get to the store • On a diet • No working stove available • Not able to cook or eat because of health problems	FS; FI without hunger; FI with hunger	65+
Nord & Kantor, 2006	Current Population Survey Food Security Supplements, 1995–2001 (18,543)	FS (<i>see above</i>)	7-item U.S. Adult Food Security Scale (30-day reference period) – not available	Household FS status: Very Low FS (FI with hunger) = multiple indications of reduced food intake and disrupted eating patterns due to inadequate resources for food	65+
Quine & Morrell, 2005	Older Persons Health Survey (9,000)	FS (<i>see above</i>)	1 item: In the past 12 months, were there any times that you ran out of food and couldn't afford to buy more?	FS = no FI = yes	65+
Radermacher et al., 2010a	37	FS (<i>see above</i>)	Multi-modular questionnaire: amount of food in household (1 item), barriers to getting food (24 items – drawn from Food Security Survey Module adapted by Wolfe et al. [27]), access to food (14 items), factors that influence eating habits (12 items), strategies employed to get food (3 items) – (<i>only "Barriers" were provided</i>)	Responses (never true, sometimes or often true, yes or no) were analysed separately for each statement and compared across groups	58–85

Continued

Table 2: Continued

Study	Data Set (sample size)	FI Definition	FI Instrument ^a	FI Operationalization	Age Definition (years)
Russell et al., 2016	2,642	FI = "either limited availability of nutritious foods and/or the inability to acquire nutritionally acceptable and safe foods"	12 statements relating to individual and household food situations adapted for older people	FS = "never true" responses to every statement FI = "sometimes true" or "often true" to any one of the statements	49+
Russell et al., 2014	Blue Mountains Eye Study (3,068)	FI = "the lack of access and ability to acquire safe and nutritious foods"	12-statements i) 10 statements adapted for older people ii) 2 additional statements designed to capture food insufficiency	Response possibilities: never true, sometimes true, often true; FS = responds "never true" to all 12 statements FI = responds "sometimes true" or "often true" to any of the 12 statements	49+
Sattler & Sun Lee, 2013	Georgia Advanced Performance Outcomes Measures Project 6 (GA Advanced POMP 6) (706)	FI (<i>no definition given</i>)	Modified 6-item U.S. Household Food Security Survey Module	FS summary score calculated for 4 study waves: FS = 0-1; FI = 2-6 [Persistent FI = FI over 4 study waves; Persistent FS = FS over 4 study waves; Became FI or FS = changes to FS status over study period]	65+
Shannon et al., 2015	Georgia Aging Information Management System (38,812)	<i>No definition(s) given</i>	Modified 6-item U.S. Household Food Security Survey Module	FS summary score: FS = 0-1; FI = 2-6	65+
Sharkey, 2004	908	FI = 'lacking enough money to buy food'	FI as 1 item from Nutritional Health Screen: "not always having enough money to buy needed food"	FI = positive response; FS = negative response	60+
Sharkey, 2005	North Carolina Nutrition and Function Study (268)	Food insufficiency (<i>no definition given</i>)	Food insufficiency (6-month reference period) 3-items: i) Were there days when there was no food in the house and no money or food stamps for food? ii) Were there days when you had to choose between buying food and buying medication? iii) Were there days when you had to choose between buying food and paying bills?	Food sufficient = responded no to all 3 questions; Risk of becoming food insufficient (RFI) = responded yes to question ii or iii; Food insufficient = responded yes to question i	60+
Sharkey & Schoenberg, 2005	North Carolina Nutrition and Function Study (n = 268)	Food insufficiency, Food adequacy (<i>no definitions given</i>)	(6-month reference period) Absence of food: i) Were there days when there was no food in the house and no money for food?	Food sufficient = no response to all four questions; Risk of being food insufficient = responds no to "absence of food" questions, but yes to either "forced scarce-resource decisions" question;	60+

Continued

Table 2: Continued

Study	Data Set (sample size)	FI Definition	FI Instrument ^a	FI Operationalization	Age Definition (years)
			ii) Were there days when you skipped meals because there was no food in the house and no money for food? Forced scarce-resource decisions: i) Were there days when you had to choose between buying food and buying medication? ii) Were there days when you had to choose between buying food and paying bills? Food adequacy i) Do you usually have enough food to eat? ii) How often do you not have enough money to afford the kind of food you should have? iii) Did you have to take any of the following actions to make sure you had enough to eat? • Obtain free food • Borrow money from friends or relatives • Prepare cheaper meals • Prepare smaller meals	Food insufficient = responded yes to either “absence of food” question Food adequacy (scoring not indicated)	
Sun Lee & Frongillo, 2001	NHANES III (6,596) + NSENY (553)	Food insufficiency (used interchangeably with FI) = “an adequate amount of food intake due to lack of resources”	(NHANES III) food insufficiency: Do you have enough food to eat, sometimes not enough to eat, or often not enough to eat? 3-item FI over past 6 months (NSENY): i) Do you have enough money to buy the food you need most of the time? ii) Have you skipped one or more meals because you had no food in the house or you thought that soon you might not have enough food? iii) Have you had to choose between buying food or paying bills or buying something else you needed?	(NHANES III) Food insufficient = positively reporting sometimes or often did not get enough food to eat (NSENY) FS = 0 positive responses FI = 1 or more affirmative responses	60–96
Sun Lee & Frongillo, 2011	1988-1994 NHANES (6,596), Nutrition Survey of the Elderly in New York State (1994) (553)	Family food insufficiency = “an inadequate amount of food intake due to lack of resources” FI (no definitions given)	(NHANES) Family food insufficiency question: Do you have enough food to eat, sometimes not enough to eat, or often not enough to eat? 3-item FI over past 6 months (NSENY): i) Do you have enough money to buy the food you need most of the time? ii) Have you skipped one or more meals because you had no food in the house	(NHANES) Food insufficient = positively reporting sometimes or often did not get enough food to eat (NSENY) FS = 0 positive responses FI = 1 or more affirmative responses	60+

Continued

Table 2: Continued

Study	Data Set (sample size)	FI Definition	FI Instrument ^a	FI Operationalization	Age Definition (years)
			or you thought that soon you might not have enough food? iii) Have you had to choose between buying food or paying bills or buying something else you needed?		
Temple, 2006	2001 Australian Bureau of Statistics National Household Survey (4,650)	FI (see above)	1 item: In the past 12 months, were there any times that you ran out of food and couldn't afford to buy more?	FS = "no" FI = "yes"	65+
Woltl et al., 2012	2007–2008 NHANES (1,511)	FI (see above)	10-item Adult U.S. Food Security Survey Module	Scale of "1" to "4", with "4" indicating full FS and "1" indicating very low FS	65+
Study	Data Set (sample size)	FI Definition	FI Exploration		Age Definition
Qualitative Studies					
Frongillo et al., 2003	9	FI (see above)	In-depth interview questions: • Week-to-week food situation (how they obtain their groceries, whether they had any help with meals, whether they attended any food programs, whether they had problems accessing food), use of social networks, frequency of family contacts, changes in their health or social support, events of the past week • Follow-up questions to probe more fully emerging issues		59–76
Green-LaPierre et al., 2012	8	FS (see above)	In-depth interview • Guide formulated using Radimer's conceptualization of FI and hunger (individual and household dimensions and 4 components: quantitative, qualitative, psychological, social) • Questions drawn from Institute for Research on Poverty (procurement and preparation of food, typical daily food routine, if they had ever had difficulty getting enough food) • Hypothetical affordability scenarios (comparing monthly income to essential expenses)		65+
Keller et al., 2006	18	FS (see above)	Semi-structured interview guide (12 questions, with #1–5 concerning food access, preparation, insecurity, choice): 1. Changes in health can affect a person's ability to shop for groceries. Has a change in health affected how you do your shopping? 2. Changes in health can affect a person's ability to prepare food. Has a change in health affected how you cook or prepare food?... 3. Changes in health can affect a person's ability to manage eating. Has a change in health affected the food and how you eat?... 4. Sometimes people have problems getting the food they need. Can you tell me about a time when this happened to you? Do you ever run out of money for food? How often does it happen that you (and your husband) do not have enough money to afford the food you should have? In the last 6 months did you or anyone in your household receive food from a food bank, soup kitchen, or other charitable agency? 5. What is the most important reason for choosing food? ...		65+
Pierce et al., 2002	35 focus group participants, 12 interviewees	Nutrition concerns, stress related to nutrition	Focus group questions • Name one food you would not buy at the grocery store • What do you consider when deciding what to have for dinner? • How do you decide what is good for you?		75–90

Continued

Table 2: Continued

Study	Data Set (sample size)	FI Definition	FI Exploration	Age Definition	
			<ul style="list-style-type: none"> • Sometimes you can't eat the foods that you think are good for you. What are some of the reasons you can't eat the way you think you should? • Looking at the things (concerns) we've listed, which affect the way you eat the most? Which are the most common among women like yourself? <p>Open-ended Interview For each major concern, the interviewer asked about the quality of social supports</p>		
Study	Data Set (sample size)	FI Definition	FI Exploration	Age Definition	
Radermacher et al., 2010b	44	Food access = cost and financial considerations, health and physical capacity, limited access to transport, intrapersonal factors (lack of motivation), and lack of availability of preferred foods are barriers to accessing nutritious food	Focus group questions Where they shopped, how they got to the shops, experiences of preparing and eating their meals	58-90	
Wolfe et al., 2003	46 households	FI (<i>see above</i>)	Semi-structured interview guide: <ul style="list-style-type: none"> • questions about what participants ate, their eating environment, how food preparation and grocery shopping were done, influences on their food situation, and experiences of difficulty getting food Quantitative Measure of FI: <ul style="list-style-type: none"> • 8-items from U.S. Household Food Security Survey Module 	FS scoring based on quantitative, qualitative, psychological, and social components of the experience of FI: rating of 1.0-4.0 (FS, mild, moderate, severe FI) FS = negative response to all questions; FI = positive response to one or more of the 8 items	53-88
Wolfe et al., 1998	41 (24 follow-up)	FI (<i>see above</i>)	Semi-structured interview guide: <ul style="list-style-type: none"> • questions about what participants ate, their eating environment, how food preparation and grocery shopping were done, influences on their food situation, and experiences of difficulty getting food Follow-up telephone survey: <ul style="list-style-type: none"> • Cornell-Radimer items • Cornell-Frongillo item • Nutrition Screening Initiative FI Item • Community Childhood Hunger Identification Project (CCHIP) items • Urban Institute Items • USDA items 	FS = "not true" or "no" responses to all items; Household FI = "sometimes true" or "often true" to one or more household items or to the individual qualitative item; Individual FI = "sometimes true", "often true" or "yes" to one or more individual items	60-89
Wolfe et al., 1996	41	FS (<i>see above</i>); FI (<i>see above</i>)	Semi-structured interview guide Open-ended questions about their food situation (i.e., have you ever had difficulty getting enough food? Please tell me about that situation, describing it as fully as you can. What led to it? How did it begin?)	65+	

NHANES = National Health and Nutrition Examination Survey; NHIS = National Health Interview Survey; NSENY = Nutrition Survey of the Elderly in New York
^a Food insecurity definition most commonly cited "state when the availability of or ability to acquire nutritionally adequate and safe food in socially acceptable ways is limited or uncertain", and food security definition most commonly cited "having access at all times to enough food for an active and healthy lifestyle".

expenditures). The vast majority of studies were found to cite an “aging population” as the principal justification for this area of inquiry.

Health tended to be the main outcome (problem) of interest, despite not having been included in any health-related search terms. As presented in Figure 2, there were two ways that aging and food insecurity tended to be problematized from closely examining the rationale in these studies: food insecurity as it impacted aging and health, and aging as it impacted food insecurity and health. More specifically, the rationales were presented in such a way that either food insecurity exacerbated age-related declines in health, or aging worsened health-related outcomes deriving from food insecurity. Descriptors of the relationships between food insecurity, aging, and health included buffer, exacerbate, interrelate, contribute, impact, and aggravate.

Thematic analysis of the implications from these studies, in terms of how researchers framed their findings, and how and where study findings were directed, included (a) to prompt or support further research; (b) to set policy; (c) to guide the content, target, or evaluate services or programs (including screening); and (d) to suggest a professional role in addressing food insecurity among older people (Table 7).

Discussion

We undertook this literature review to bring together the disparate literature concerning food insecurity among older people, with the goals of clarifying some of the tendencies and contradictions of this broader literature, as well as prompting more critical examination of the ways that aging is relevant to food insecurity research.

Our research objectives were to (a) characterize the methodological, empirical, and conceptual contributions of each study; and to (b) thematically analyse the rationale and implications underpinning each study, as well as those conceptual mechanisms hypothesized to connect aging to food insecurity. Studies arose from a variety of research traditions, as well as a mix of methodological approaches. We found age and food insecurity to be operationalized very differently across studies. These differences likely derived from the multi-disciplinarity of this area of inquiry, as well as the widespread use of already existing data sets. Methodological differences were also likely attributable to the stated concerns around the uniqueness of the phenomenon of food insecurity among older people and, accordingly, a perceived potential inadequacy of food insecurity survey instruments to fully capture the complexity and extent of the issue in the older population.

Estimates of food insecurity among older people varied greatly between studies, which was likely caused by different research contexts, as well as different measurement instruments used between studies. These findings underscore the critical importance of consistent measurement, particularly the employment of the HFSSM which has been shown to be an appropriate measure of food insecurity among older people (Nord, 2003). Our findings also underscore the value of national population-level monitoring, as there currently exist few studies which would allow for international profiling of this issue for comparison purposes. Overall, with few exceptions, there was little exploration of ecological levels of influence on food insecurity beyond the individual, to include geographical, political, or social influences. For example, while many studies statistically controlled for income, or other measures of socio-economic status, only one study questioned the economic circumstances as the basis of the research (Emery, Fleisch, & McIntyre, 2013b).

Empirically, the emphasis of this collection of studies tended to attempt to explicate the perceived “complexity” of food insecurity among older people according to a range of different risk factors or predictors of food insecurity. This collection of studies tended to be preoccupied with individual risk factors for food insecurity, and individuals’ experiences of food insecurity. Health was prominently featured in this collection of studies, as either the outcome of interest or as mediating or moderating risk factors for food insecurity, or the lens through which older people experienced food insecurity. For example, a small collection of studies found evidence of trade-off behaviours specific to older people, including medication underuse (Afulani, Herman, Coleman-Jensen, & Harrison, 2015; Bengtson et al., 2010; Bhargava et al., 2012; Sattler & Lee, 2013), and household utilities usage (Nord & Kantor, 2006), or “treat or eat” and “heat or eat” trade-offs respectively.

In characterizing the conceptual contributions of this area of research, we detected conceptual ambiguity with respect to the relevance of aging to food insecurity. This was evidenced in two ways; first through the limited application of theory, and second, through the many assumptions that we found to be taking place as determined by mining the mechanisms implicitly proposed by researchers to connect food insecurity to aging.

In documenting all of the theoretical references, applications of theory, and novel conceptual models and frameworks, we found that much of the theorization in this collection of studies to be oriented towards explaining how older people uniquely experience food insecurity and are uniquely vulnerable to food insecurity. For example, many theoretical applications delved

Table 3: Thematic representation of conceptual mechanisms hypothesized to connect aging to food insecurity

Aging	
Complexity	
<ul style="list-style-type: none"> – Low incomes, limited mobility, poor health (Keller et al., 2006; Shannon et al., 2015; Frongillo et al., 2003; Wolfe et al., 1998; Wolfe et al., 1996) and lack of social support (Radermacher et al., 2010a) – In addition to economic constraints, older people face greater variety of physiologic and social barriers to healthful diet (requiring therapeutic diet), physical disability and dependence on others for food assistance, social isolation and functional impairments, transportation problems (Guthrie and Lin, 2002) – Older people at risk of poor nutrition through food insecurity (inadequate financial resources, functional impairments, social isolation, oral problems, dietary modifications, regular use of medications) (Sharkey, 2004) – Frequent co-existence of functional impairments (that impact ability to acquire, prepare, eat food), social isolation, adverse effects of multiple medications, depression, limited access to resources, challenges in local food environment (Green-LaPierre, 2012) – More factors related to nutritional and health status for older people, including aging process, health, psychological, social, economic factors (Johnson et al., 2011) 	
Aging Process	
<ul style="list-style-type: none"> – Increasing cognitive and physical limitations (Keller et al., 2006; Shannon et al., 2015; Frongillo et al., 2003) – Vulnerability through aging process (changing circumstances, chronic disease and physical disabilities that impact ability to access, prepare, and consume food) (Russell et al., 2014; Radermacher et al., 2010a) – Age aggregates negative effects of poor health on elderly (Nord, 2003) – Social capital – increasing reliance on others alongside aging (Green-LaPierre et al., 2012) – Changes with aging – physical (disabilities), psychological (depression, cognition), social changes (widowhood, poverty, relocation) that impede ability to obtain and prepare optimal meals (Pierce et al., 2002) 	
Physical, Cognitive, Physiological Differences	
<ul style="list-style-type: none"> – Prevalence of food insecurity among older people may be lower (compared to younger populations), but health consequences may be more serious (Afulani et al., 2015; Bhargava et al., 2012) – Reduced mobility or function in isolated elderly or ill persons (Wolfe et al., 2003) – Dietary vulnerability, malnutrition among older people (Klesges et al., 2001; Wolfe et al., 1998; Radermacher et al., 2010a) 	<ul style="list-style-type: none"> – Reduced appetite with aging, making food shortage less likely if the amount of required food is less (Quine and Morrell, 2005)
Material Hardship	Material Advantage
<ul style="list-style-type: none"> – Older pensioners more likely to live in low-income households than younger pensioners (Deeming, 2011) – Housing costs absorb “lion’s share” of seniors’ monthly pensions (Green-LaPierre et al., 2012) 	<ul style="list-style-type: none"> – High proportion of home ownership (Temple, 2006; Russell et al., 2014)
Life Course	
Behavioural and Physiological Responses to Adversity	
<ul style="list-style-type: none"> – Cumulative effects of persistent or intermittent food insecurity or limited food access on energy stores and nutritional risk status (Brewer et al., 2010, Johnson et al., 2011) 	
Cumulative Disadvantage	Resilience, Coping Skills, Resourcefulness, Past Experiences, Generational Lens
<ul style="list-style-type: none"> – Unmet needs, accumulated disadvantage can contribute to health status in later life (Alley et al., 2009) 	<ul style="list-style-type: none"> – Elderly may have different perceptions, attitudes, experiences than younger people (Guthrie and Lin, 2002; Sun Lee & Frongillo, 2011) – “Generational lens” – pride, self-sufficiency, “you cannot always get what you want attitude” colours the nature of food insecurity for older people (Green-LaPierre et al., 2012) – Resourcefulness developed from past experiences, developed unique strategies to cope with hunger (Green-LaPierre et al., 2012) – Older people may be more resilient to food insecurity (Johnson et al., 2011)

Table 3: Continued

Geography

Older People Vulnerable to Community Characteristics

- Older people prone to isolated living conditions and limited incomes – different neighbourhood environment may have unique impact on food insecurity for older people by shaping abilities to travel and purchase affordable, healthy foods (Keller et al., 2006; Shannon et al., 2015; Frongillo et al., 2003, Chung et al., 2011, Woltil, 2012)
- Differential availability of food programs, transportation, grocery stores in different communities (Keller et al., 2006; Shannon et al., 2015; Frongillo et al., 2003, Chung et al., 2011, Woltil, 2012)
- Amplification of immediate environmental factors on older people to result in greater food hardship – due to fixed incomes alongside higher food prices and travel costs + strong neighbourhood attachments, limitations in driving/walking/public transit infrastructure make access outside neighbourhood difficult) (Fitzpatrick et al., 2015)
- Local social supports for older people may be dwindling – volunteer sector shrinking and younger people outmigrating for employment [Sharkey & Schoenberg, 2005]
- Without public transit, older people are reliant on volunteer drivers, private transport services, or reliant on family and friends (Green-LaPierre et al., 2012)

Healthy Survivor Effect

- Older people who have managed to remain living to advanced old age in the community are more likely to have more family, neighbor, voluntary, or other sources of care and assistance to buffer against food insecurity (Quine & Morrell, 2005)

Living Arrangement

Living Alone, Homeboundness

- Vulnerability derived from living alone, unable to leave dwelling to shop, unable to prepare food without assistance (Quine & Morrell, 2005)
- Homeboundness and food insufficiency (Sharkey & Schoenberg, 2005)
- Older people living at home and living alone vulnerable to food insecurity (from decreased fertility rates, relational ambivalence, decreasing capacity of younger generations to care (Radermacher et al., 2010a)

Social-Relational

Social Support

- Disconnectedness from intergenerational family networks and informal networks for logistics of food (providing transportation, buying food supplies, cooking) – friends and family cannot always help as planned (Frongillo et al., 2003, Green-LaPierre et al., 2012, Radermacher et al., 2010b)
- Social support can act as a buffering effect on food insecurity among older people (as a management strategy, help-seeking behaviour) (Frongillo et al., 2003)

Social Isolation

- Social isolation in older people contributes to food insecurity, and is augmented by broader factors of poverty, gender, race (Keller et al., 2006; Shannon et al., 2015; Frongillo et al., 2003, Chung et al., 2011, Woltil, 2012)
- Older people vulnerable to being alone – social dimension of food (social aspect of eating, difficulty in food preparation for one person, depression-induced appetite loss) (Temple, 2006)

Subgroup Disadvantage

Subgroups of Older People at Risk for Poor Nutrition and Health Status (economic, social exclusion, disparities in health care access)

- Women, racial or ethnic minorities, economically disadvantaged, homebound (Keller et al., 2006; Shannon et al., 2015; Frongillo et al., 2003, Sun Lee & Frongillo, 2011)
- Female, African American, living in a central city, living in southern USA, oldest old, eating alone, disability, along with income may account for differences in FI between lower and higher income groups (Guthrie & Lin, 2002)
- Disparities in health care access, underutilization of medical care services across subgroups of older people, could potentially lead to differential effects on nutritional status, overall well-being, successful aging (Bhargava et al., 2012)

Gender

Economic Disadvantage (paid work, savings, assets, pensions, poverty risk)

- Women as economically vulnerable subgroup of older people due to discontinuation of work and/or lack of savings or pensions (Keller et al., 2006; Shannon et al., 2015; Frongillo et al., 2003)
 - Limited monetary resources available to older women (Quine & Morrell, 2005)
 - Senior women disproportionately affected by poverty (Green-LaPierre et al., 2012)
 - Socio-biology could explain how sex could modify association between food insecurity and obesity (Ahn et al., 2014)
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Continued

Table 3: Continued**Race/Ethnicity****Barriers to Accessing Services and Supports**

- Differential access to necessary material resources may be one way disadvantaged groups experience poorer health outcomes (Keller et al., 2006; Shannon et al., 2015; Frongillo et al., 2003)
- Older subgroup (ethnic minorities) experience high nutritional risk and many barriers to accessing services and supports (Radermacher et al., 2010a)

Economic Disadvantage

- Minority older people vulnerable (limited life course opportunity, cumulative disadvantages, current NH environments) (Woltil, 2012)
- Relationships between race/ethnicity, socio-economic status, health and cultural aspects of dietary intake important to food insecurity among older people in minority groups (Klesges et al., 2001)

Income**Fixed, Inadequate Income**

- Older people vulnerable due to finances (fixed income, medical costs, unexpected expenses) (Keller et al., 2006; Shannon et al., 2015; Frongillo et al., 2003, Johnson et al., 2011)
- Inadequate finances and infirmity lead to inability to access food (Quine & Morrell, 2005)
- All elderly at risk for poor nutrition, limited resources can further increase risk (Guthrie & Lin, 2002)
- Entering retirement with stable or declining incomes, forced to make trade-offs between basic needs (food and health care) [Bhargava & Sun Lee, 2016]

Stable (doesn't fluctuate, buffers against FI, acts as income floor)

- Public and private pensions reduce fluctuations in income and buffers against food insecurity (Temple, 2006)
- Low-income older people's households have somewhat higher incomes, more stable incomes, and more assets than lower-income households (Guthrie & Lin, 2002)
- Majority of older people (especially vulnerable subgroups) rely on government-funded income supplementation (Emery et al., 2013b)

Government Concessions and Income Supports

- Concessions on energy consumption, food budget is discretionary with other living expenses (medical, heating and/or cooling costs, costs of transport) often paid first, remaining income allocated to food (rising food prices accommodated within limited budget) (Russell et al., 2014)
- Many low-income older people fail to qualify for supplemental low-income subsidy benefits (Sattler & Sun Lee, 2013)
- Changes to age eligibility, low-income "near seniors" could be subjected to extra years of food insecurity (Emery et al., 2013b)
- Worsening financial conditions, including greater medical or social service needs, or changes in coverage, in concert with stable income (Sharkey & Schoenberg, 2005)
- Range of concessions available to older people (council rates, water and sewage, electricity, registration and public transport), as well as heavily subsidized pharmaceuticals, universal health care (Temple, 2006)
- Canada's retirement system and in-kind benefit entitlements (housing, transportation, drug coverage) acts as an income floor to affect material conditions to address poverty in older people (Emery et al., 2013b)

Health**Financial**

- Increased health care burden (multi-morbidity and polypharmacy) and increased dietary restrictions can lead to accrued cost or reduced availability (Woltil, 2012)
- Restricted mobility, physical disability, health insurance, spending more on health care away from food budget (Keller et al., 2006; Shannon et al., 2015; Frongillo et al., 2003; Temple, 2006)
- Poor health may lead to food insecurity among older people through high medical bills, higher costs of medications (Sun Lee & Frongillo, 2011)
- Better physical functioning and health reduce risk of financial difficulty acquiring food or absence of financial difficulty acquiring food reduces risk of poor health and physical disability (Klesges et al., 2001)

Disability**Impaired Access (mobility, transportation) to Use, Prepare, Consume Food**

- Physical limitations or mobility-related barriers to food access and consumption (Chung et al., 2011; Woltil, 2012; Sun Lee & Frongillo, 2001; Russell et al., 2016)

Chronic Illness**Health-Related Financial Burden, Progression/Compounding of Disease and Disability (Mobility)**

- Chronic illness impedes mobility and strains limited budgets to affect food access of vulnerable older people (Sattler & Sun Lee, 2013)
- Rise in drug costs disproportionately affects older people (high prevalence of polypharmacy) leading to prescription cost-cutting strategies (Bengle et al., 2010; Afulani et al., 2015)
- Obesity exacerbates age-associated decline in physical function, cascade effect that initiates new disablement processes (Brewer et al., 2010)

Table 3: Continued

<ul style="list-style-type: none"> – Diabetes among older people exacerbated by food insecurity, worsening financial conditions due to shifting health costs to individuals, increased costs of basic needs, intervening or unexpected events (hospitalizations, loss of drug or food stamp coverage) (Sharkey, 2005) – Higher burden of chronic illness in older people, older people responsible for larger proportion of personal health care spending than other age groups (trade-offs between basic needs) (Bhargava et al., 2012) 	
Behavioural	
Cost-Related Trade-offs	Shifting Sands of Social Class
<ul style="list-style-type: none"> – Food compromises (due to health-related food requirements, physical functioning, unexpected health care costs) (Keller et al., 2006; Shannon et al., 2015; Frongillo et al., 2003) – Choosing inexpensive unhealthy foods (Alley et al., 2009; Sharkey & Schenberg 2005; Ahn et al., 2014) 	<ul style="list-style-type: none"> – Social class may help to explain patterns of food consumption but may be less relevant to older people (Deeming, 2011)
Stress Eating	
<ul style="list-style-type: none"> – Stress and depression may lead food-insecure older people to cope with stress by eating excessively (Ahn et al., 2014) 	

into the ways that different ecological factors influence food access for older people (Goldberg & Mawn, 2014; Keller et al., 2006; Wolfe, Olson, Kendall, & Frongillo, 1996). Of the researchers that constructed their own conceptual models, we found the models to predominantly situate food insecurity in a pathway of interrelationships with other health behaviour risk factors and outcomes, which could be described as frameworks of disease and disability processes (Brewer et al., 2010; Klesges et al., 2001; Sharkey, 2004). A collection of studies by Wolfe et al. (1996, 1998, 2003) sought to demonstrate how food insecurity is complicated among older people. Specifically, these researchers comprehensively related a diversity of factors that contribute to and reinforce food insecurity among older people (Wolfe et al., 1996), outlined the time-framed progression of food insecurity (Wolfe, Olson, Kendall, & Frongillo, 1998), and characterized the different components of the experience of food insecurity (Wolfe, Frongillo, & Valois, 2003).

Many studies did not make any theoretical references. Without an explicit theoretical framework to guide the research inquiry, study findings and implications are more apt to take on and reinforce status quo assumptions around aging and the root causes of food insecurity (Burns et al., 2010). By thematically analysing the hypothetical mechanisms that were most often passively offered and not substantiated with evidence or a citation, we found that many assumptions were being made as to how aging relates to food insecurity. In doing so, we drew on concepts from the “sociology of knowledge”, such that the production of knowledge must be contextualized within the historical and social space in which it is produced. Scientific knowledge is socially produced and reproduced, and is not inherently unbiased, objective, or politically neutral as it is often presented. Such unchallenged “knowledge” can act as a normalizing force by coordinating social practices and influencing popular perception, and is aptly represented in research endeavors. We were able to demonstrate some clear tendencies with respect to the ways that researchers have assumed aging to be relevant to food insecurity.

One of the major themes of our analyses was “complexity” in that aging is complicated and introduces a whole host of changing variables – particularly physical decline – that coincide with inadequate income, making it difficult to accurately measure and/or address the issue of food insecurity among older people. The portrayal of food insecurity among older people as being complicated by their presumed frailty and dependence runs aground as it relies on the notion of universality of risk as well as purports false equivalency with respect to the importance of risk factors. Complexity also suggests the impossibility of capturing – let alone

Table 4: Mechanistic explanations of potential sources of under-detection of food insecurity among older people

Selectivity Bias	Different Phenomenon	Reporting Bias
<ul style="list-style-type: none"> • Food insecurity groups and oldest-old groups may have migrated out of population as a result of institutionalization or death (Temple, 2006) • Elders are an extremely heterogeneous population subgroup; general estimates may mask the needs of a particular group (Guthrie & Lin, 2002) • Availability of concessions on reaching official retirement age, possibly those at greatest risk of food insecurity are no longer living independently in the community (Russell et al., 2014) 	<ul style="list-style-type: none"> • Different physical and socio-economic conditions, perceptions, attitudes, experiences throughout life (Sun Lee & Frongillo, 2001) • Food insecurity likely different in older people (Wolfe et al., 2003) <ul style="list-style-type: none"> – Different perception of food insecurity due to past experience such as food deprivation during Great Depression – Anxiety related to accessing food for health is important part of food insecurity for older people; financial resources constraint doesn't capture FI from other causes such as limited mobility or transportation 	<ul style="list-style-type: none"> • Persons in older cohort known to pride themselves on self-sufficiency and ability to make do, may be reluctant to admit they could not afford food (Quine & Morrell, 2005) • "Coping" effectively renders the issue of food insecurity among older people invisible (Green-LaPierre et al., 2012)

addressing – the issue, and the futility in approaching the issue with a single intervention lever. Another major assumption was with respect to the “aging process”, whereby aging was framed as progression entailing inevitable (and often insinuated universal) general decline, disability, and disease. Although there are indisputably physical, physiological, and social changes that take place as people get older, the assumption that a group of people above a certain age, or even those who share the same chronological age, are all self-resembling is not scientifically substantiated. Such assumptions equating old age with illness and requiring expensive medical intervention are increasingly being questioned. On the contrary, there is evidence to suggest that older people are experiencing improved (health adjusted) life expectancy (Cutler, Ghosh, & Landrum, 2014; Steensma, Loukine, & Choi, 2017).

Other evidence of normative assumptions on aging were found in the ways that food insecurity was problematized in the stated study rationales. Many studies were based on the premise of projected demographic changes, resulting in increased numbers of older people consuming nutritionally inadequate diets (for whatever reason), ultimately resulting in increased and unsustainable health care expenditures. Such assumptions about morbidity and disability, and what the aging population will mean for health care and social spending, is consistent with the social construction of aging as a medical problem. What has been described as contemporary demographic alarmism is based on the notion that the increase in proportion of older people in a population is a burden, as older people are cast as a drain on society's resources. Indeed, many scholars suggest that continuously emphasizing the “frail and malnourished senior” alongside the looming health care crises is a form of ageism that functions to provide legitimacy for moves to limit existing social provision for the older population.

Our thematic analysis of the ways that researchers suggested their studies would contribute to addressing this issue included; further research, policy, services, and programs – including screening, as well as defining professional roles. These implications are also consistent with the way that Estes and Binney (1989) had the foresight more than three decades ago to observe the power of the biomedical paradigm to “both define the phenomena of aging in biomedical terms, and to pursue policy makers that the solutions to the aging problem are ones that perpetuate control by biomedicine” (p. 589). They described four dimensions of the “praxis of aging as a medical problem” – to include the scientific, the professional, and the policy area, and the lay or public perception; and discuss how these dimensions and their consequences contribute to the unbridled dominance of this model (p. 587). For example, the scientific dimension of the praxis Estes and Binney (1989) describes old age as a “process of basic, inevitable, relatively immutable biological phenomena” which “fosters research on the isolation, etiology, and intervention of these processes ... contributing to a trend of methodological individualism and reductionism” (p. 588)... whereby solutions to aging issues are “contingent upon the continuation of biomedical research” (p. 589). Other literature on food insecurity has demonstrated how such an individualized and de-politicized research focus is inadequate to address this issue across all ages (Carlson, 2014; Poppendieck, 1995; Riches, 1999).

It is important to differentiate between social security programs and social and welfare services. For example, in Canada, social security programs are the responsibility of federal, provincial, and territorial governments to provide direct economic assistance including Old Age pensions and other social assistance programs. Social and welfare service programs, on the other hand, are community-based and developed to respond to individual needs entailing services such as home-delivered meals.

Table 5: Summaries of rationale and implications for each study in the current review collection

Study	Rationale	Implications
Afulani et al., 2015	Aging population alongside budgetary expense of Medicare; older people facing food insecurity and juggling health care costs, food, basic living expenses, unable to comply with physician recommendations and treatments reduces positive impact of Medicare investments.	Clinical screening for cost-related medication underuse – food insecurity can be used as a risk factor for assessment Medication assistance programs – need for removing cost barriers to accessing medications (to ensure compliance and increased disposable income for at-risk households)
Ahn et al., 2014	Obesity is public health concern among older people (increased risks of disability, chronic conditions, poor life quality – increased per capita health spending – more likely to take early retirement); many unknown factors.	Health policy – easy food insecurity and obesity, recommend to provide older people with food assistance program that can decrease body composition and depressive symptomology Societally and community – make healthier diet options affordable and accessible while promoting physical activity (example given: community gardens)
Alley et al., 2009	Gains in life expectancy unequally distributed; health disparities by poverty, race/ethnicity. Unmet needs related to health care, food, housing are interrelated indicators of material hardship.	Interventions – strategies to improve population health and to reduce health disparities; must address range of basic human needs (affordable, quality health care; food, and housing)
Bengle et al., 2010	Continuing fluctuations in U.S. economy makes need for prescription and food assistance programs increasingly important; funding for food assistance programs are a potentially effective preventive measure of chronic disease complications.	Dietetic practice – prevention of disease complications of utmost importance Public policy development – budgetary constraints and increasing need for programs
Bhargava et al., 2012	Aging population and U.S. economic recession have implications for public assistance programs (need to control Medicare expenditure while ensuring access to quality health care services). Older people with multiple chronic conditions and low income are forced to choose between basic necessities (i.e., food, medical care, medication). Explore economic cost of food insecurity, and economic benefit of solutions among vulnerable older people.	Future research – underscores need for more nationally representative data sets and longitudinal data Policy – inform effectiveness of food assistance and health care programs; develop interventions that will most benefit low-income older people Public assistance programs and other services – eventually used at local, state, federal levels to enhance delivery of programs and services to meet unique needs of older people
Bhargava & Sun Lee, 2016	Escalating health care costs and disproportionate share of health care resources consumed by aging population; longer life expectancy and higher prevalence of chronic diseases increases health care burden of older people; food insecurity is clinically relevant problem with significant implications for health care utilization and costs.	State and federal programs and policies – guidance for improving effectiveness of nutrition and health care services for low-income older people
Brewer et al., 2010	Growing obesity epidemic, association of food assistance with obesity have led to suggestions that funding for food assistance programs should be reduced; need to better understand food insecurity-obesity paradox.	Food assistance programs – physical limitations should be considered and investigated as additional explanatory factors related to food insecurity-obesity paradox; obesity should not be used as reason to limit or deny food assistance
Chung et al., 2011	Limited access to nutritional foods among older people may exacerbate risk for poor health outcomes; research gap exists on contextual, neighbourhood-level contributors to food insecurity among older people.	Research contribution – to understanding of impact of how neighbourhood may affect food insecurity among older people
Deeming, 2011	Adequate food and nutrition essential to survival, maintenance of health and function in society. Public health has potential to reduce exposure to major health risks from poor diet particularly in older people. Growing recognition of need to increase quality of diets among older people in general, but need to identify SES and household characteristics of those most at risk of food poverty in U.K. New dietary population data sets allow for new forms of analysis into social inequality and exclusion.	Social policies – “upstream” measures may be needed to reduce risk of food and nutrition insecurity (i.e., readjustment of value-added tax on food products, targeted income policies, clear and consistent health messaging to help people make healthy food choices)
Emery et al., 2013b	Recent policy decision to gradually increase age eligibility for Canada’s public pension benefits from 65 to 67. A misunderstanding exists of how these benefits affect the material conditions of vulnerable Canadians.	Policy implications – increased levels of food insecurity among older people anticipated to have health consequences that could potentially reduce or neutralize savings accomplished through pension reform

Continued

Table 5: Continued

Study	Rationale	Implications
Fitzpatrick et al., 2015	Living in food desert may not only affect diet quality, but also risk of food hardship, household budget trade-offs, and need for food assistance programs; aging population, strong NH attachments of older people (despite changing foodscapes), limitations on driving/walking/public transit make food access outside immediate area difficult particularly for older people.	Policies – target older people with transportation limitations living in food deserts; may improve their food sufficiency
Frongillo et al., 2003	Food insecurity among older people due to low incomes, limited mobility, poor health which exacerbates disease and disability and leads to extended hospital stays; social support (formal, informal) affects whether older people with financial or physical limitation(s) experience food insecurity; social support and food insecurity interact in complex ways that new research approaches allow for describing dynamic patterns.	Future research – demonstration of usefulness of innovative, feasible, and inexpensive concurrent events research method for investigating nutrition issues in older people
Goldberg & Mawn, 2014	Food insecurity among U.S. households is significant health and social problem; research on food insecurity among older people is limited; understanding of antecedents to food insecurity among older people will help to inform policies and practices that promote health in older people.	Screening – implementation of screening measures to assess for food insecurity among vulnerable older people in order to identify and refer to social services and government agencies Professional position – nursing to make assessment of food insecurity part of nursing process when working with older people in community settings, implementation in nursing curriculum (advocacy begins with awareness)
Green-LaPierre et al., 2012	Aging population, changing world view, coping strategies may be lost (increases in rates of food insecurity). Current food security measurement tools (focused on low-income as most important determinant) may not accurately capture other major enablers and barriers; may not have full picture of food insecurity among older people.	Social policies and programs – importance of ensuring progressive, sustainable social policies implemented at multiple levels to reduce nutritional health inequities among vulnerable subset of older people (lone, low-income senior women)
Guthrie & Lin, 2002	Aging population – challenge to meet health care needs and associated services; good nutrition can be cost-effective way to maintain health and QoL of older people; considerable federal resources devoted to promoting ability of especially low-income older people to obtain healthful diet.	Nutrition programs and services – educators, researchers, policymakers to have better understanding of current and future needs of aging population
Johnson et al., 2011	Older people, with fixed and low incomes, at greater risk for food insecurity, poor nutrition, poor health outcomes; older people experience material hardship differently, especially homebound older people. Material hardship as concept well suited for understanding food insecurity and poor health among homebound older people.	Addressing socio-economic inequalities in health outcomes – multidimensional approach that relies on non-income-based measures Home-delivered meal providers – aiming to promote health through nutritious meals Researchers – seeking to understand relationship between poverty and health Policymakers – responsible for broad-based changes aimed at improving population health
Keller et al., 2006	Nutrition can act as a buffer – important to understand food security as being multidimensional and an interplay of factors in older people, especially in Canada with no national or provincial food security programs for older people.	Demonstration of complexity of understanding and developing strategies to overcome food access and food insecurity among older people; further food-related services appropriate and acceptable to older people
Klesges et al., 2001	Aging population alongside reductions in national food assistance and welfare programs – need for examining adequacy of services that ensure good health and QoL for older people; reduced nutrient intakes can increase morbidity and mortality through nutritional mechanisms.	Interventions – nutritional interventions as essential primary prevention strategies to reduce potential morbidity and mortality (cost-effective due to medical and societal costs associated with malnutrition related to food insecurity) Screening – for financial difficulty acquiring food among older people
Nord & Kantor, 2006	Older people at increased risk for poor nutritional status. Difficult trade-offs for poor households (i.e., food, other essential goods and services).	Public assistance programs that support spending for home energy needs could provide measure of protection against severe levels of food insecurity (difficulty of trade-offs between food spending and seasonally high heating and cooling costs)

Continued

Table 5: Continued

Study	Rationale	Implications
Nord, 2003	Food insecurity associated with poor nutrition and health outcomes among older people. Accurate, reliable measurements of food insecurity among elderly important for monitoring and research. Main concerns: validity and sensitivity of questionnaire items.	Results allay concerns that standard scale underreports prevalence of food insecurity among older people because of differences in how older people interpret and respond to questions of Food Security Survey Module
Pierce et al., 2002	Adequate diet essential to successful aging; physical, social, psychological changes with age impede ability to obtain and prepare optimal meals; public programs, policies, initiatives administered by people with incomplete understanding of barriers.	Professional relevance – opportunity to improve understanding and communication between nutrition educators and program developers, and older people (cultural interpretation important) Programs – reassess existing programs accordingly (socially constructed meaning of program dictates utilization and effectiveness)
Quine & Morrell, 2005	Comparisons of prevalence of large-scale surveys difficult due to operational differences; important to identify magnitude of problem and characteristics of those affected.	Public health monitoring and advocacy – to take relevant steps or urge governments to take appropriate and effective action (alleviating causes of food insecurity, particularly insufficient funds, is feasible and critical to reducing health inequalities)
Radermacher et al., 2010a	Food insecurity contributes to malnutrition and nutritional risk in older people (exacerbates disease and disability, negatively impacts health and well-being, increases health care costs); aging population; ethnicity is unique vulnerability to food insecurity; ethnic diversity in Australia.	Strategies – harness resourcefulness, build on existing safety nets; build on experience and expertise of community; foster and promote partnerships between mainstream, ethnospecific, and multicultural services (to meet diverse food preferences of service users); strategies must extend beyond simply alleviating barriers at individual level
Radermacher et al., 2010b	Aging population alongside rapid global and social change; family assistance may impact capacity of older people to manage daily lives and remain independent in community.	Local governments – may experience increasing demands for services with aging population; important to work closely with local ethnic communities to engage for culturally appropriate strategies Policy and service planners – must not assume families can or will continue to look after themselves
Russell et al., 2016	Aging population alongside increasing chronic disease or physical limitation among older people; health-related QoL may be better indicator of health status than morbidity in older people; research on HRQoL and food insecurity in older people is limited, association between diet quality and food insecurity unclear, diet quality related to HRQoL.	Further research – FI important risk factor for HRQoL Health and community services – with an aim to reduce food insecurity required to reduce risk of physical health decline and to improve mental and social support for older people; ensure good health is maintained through appropriate services
Russell et al., 2014	Food insecurity impacts health and well-being; need further investigation of individuals at greatest risk of food insecurity and associated risk factors; aging population, older people with highest risk of chronic disease and physical disabilities (creates vulnerability to and from food insecurity), results in more people requiring government services and assistance; food insecurity research in Australia limited to financial ability and does not capture physical access issues (important for older people).	Future research – underestimates of food insecurity in Australia suggest further research into individual and household food insecurity essential Integrated national food policy – monitoring population to ensure all subgroups can achieve safe nutritious diet
Sattler & Sun Lee, 2013	Food-insecure older adults challenged with chronic disease management; trade-off decisions may force low-income older people to engage in cost-related medication non-adherence behaviours.	Clinical implications – overall well-being and chronic disease management impacted by persistent gap between limited resources and demands for food and medications among low-income older people
Shannon et al., 2015	Aging population, high incidence of chronic health problems in elderly that impede mobility and strains limited budgets to impact household food access; physical and social environment matters to food insecurity, but nature of relationship and differential effects among population subgroups not understood.	Future research – strengthen understanding of environmental influences on food insecurity among older people Better intervene to reduce food insecurity within growing population of older people

Continued

Table 5: Continued

Study	Rationale	Implications
Sharkey, 2004	Homebound older people at risk for poor nutritional health, which is associated with disease, disability, diminished QoL and is influenced by many risk factors; home-delivered meals service of OAANP conducts nutrition risk screening that includes individually weighted risk factors but this approach may mask effect of inter-relationships between risk factors.	Programs – interrelationships between individual components of nutritional risk status can help inform OAANP home-delivered meal programs Interventions – development of targeted interventions tailored to meet needs of homebound older people
Sharkey, 2005	Diabetes is growing problem for older people (prevalence, health consequences); vulnerable subgroups disproportionately affected and increased burden of multiple chronic conditions; daily self-management including healthful eating is important; adequacy of economic resources influences food selection and adherence to self-care behaviours; food insufficiency has implications for chronic disease management.	Clinical – management of care of chronic illness among growing homebound older people population Screening – health care providers should attempt to identify high-risk older people and develop community linkages and strategies to integrate nutrition with diabetes care plan Assessments, monitoring, targeted interventions – cost-effectiveness of ensuring food sufficiency
Sharkey & Schoenberg, 2005	Many internal, external factors influence diet; older people vulnerable to food insufficiency due to frequent coexistence of factors; food insufficiency remains highly prevalent and increases over time, despite intentions of OAANP.	Monitoring – program outcome, to target older people at greatest need through better access to culturally appropriate foods in adequate amounts Nutritional screening – paradigm shift in necessary components, purpose, required use Federal programs – expansion to combat food insecurity among older people more generally
Sun Lee & Frongillo, 2011	Despite great strength of U.S. economy and nation's nutrition safety net, 5.5% of older people still struggle with food insecurity; older people use substantially more health, medical, and other services than general population; food insecurity can bring further physical, emotional, economic burdens to elderly persons, their caregivers and health care system; understanding consequences to food insecurity in older people is important.	Nutrition and health services – better tailored services for ever-increasing and diverse older population in U.S. Further research – to understand fully the nature, extent, and prevention of food insecurity in older people (limited concepts and measures do not reflect special characteristics of food insecurity in older people)
Sun Lee & Frongillo, 2001	Number and proportion of older people with food insecurity to dramatically increase in future; current concept is based on younger people; functional impairments and health problems alter older peoples' ability to use food; distinct nutritional and health characteristics among older people, thus phenomenon of food insecurity also distinct among older people; need for more accurate characterization of food insecurity among older people.	Programs – nutrition programs should recognize and provide service to cover unique needs of older people
Temple, 2006	Chronic disease in older people influenced by diet; food insecurity among older people results in poor dietary intake, poor health status, early institutionalization, decreased productivity, decreased social interaction, increased overall social inequality; public health costs could be reduced with improvements to nutrition.	Research contribution – prevalence and correlates of food insecurity among Australian older people Rights-based argument – good nutrition helps independent and healthy aging, but food insecurity is fundamental right for all citizens
Wolfe et al., 2003	Food insecurity estimates likely inaccurate among older people. Aging population makes accurate assessment important for program and policy decisions; valid measure requires grounded construction and in-depth understanding of food insecurity among older people.	Food assistance programs – importance for older people to have right foods for health and difficulty they face in reliably obtaining these foods (programs to provide better support for provision of such foods). Mental well-being important for physical well-being in older people, preventing development of feelings of deprivation from compromised choice seems warranted.
Wolfe et al., 1998	Many older people at risk of food insecurity, measurement is important first step in nutrition screening of older people. Most measurement developed with younger populations. Wide range of estimates not only from different populations being surveyed, but also different questions being asked.	Welfare, health, nutrition programs – stages in severity of food insecurity may be helpful in determining effects of changes to programs Health care expenditures – even if experiencing food insecurity in less severe stages, compromised food choice often leads to poor nutrition, affecting national health care expenditures

Continued

Table 5: Continued

Study	Rationale	Implications
Wolfe et al., 1996	Food insecurity is potential outcome of decreased federal funding for welfare and food assistance programs. Food insecurity in older people is under-studied. Important to have holistic understanding of all factors that relate to food insecurity among older people.	Health policy and programs – health problems, physical disabilities contribute to food insecurity in elderly (difficult decisions between buying food versus medicine versus accessing health care) Future research – conceptual model can support research in determining potential effects of proposed changes in welfare, health, and nutrition programs on food insecurity in older people
Wolft, 2012	Most food insecurity research focused on younger people; with aging population, more food-insecure elderly households likely to increase; food insecurity particularly detrimental to health of older people; research should consider special circumstances faced by older people (i.e., physical limitations to access, prepare, consume food); social support important to food security but unclear how it could moderate food insecurity (sources and types of social support).	Policies and programs – donations or delivered meals alone may not suffice, and emotional social support should be considered in tandem when planning to prevent or intervene on food insecurity among older people

HRQoL = health-related quality of life; NH = neighbourhood; OAA/NP = Older Americans Act Nutrition Program; QoL = quality of life; SES = socio-economic status

Emphasizing the introduction or revision of food-based services and programs, as many studies in the current collection do, inadvertently reinforces the role of community and food-based interventions, and is contrary to a rich and established literature which points to the ineffectiveness of food-based solutions to food insecurity (Tarasuk & Davis, 1996; Power, Little, & Collins, 2015; Rideout, Riches, Ostry, Buckingham, & MacRae 2007).

A handful of studies also pointed to the role of health professionals to incorporate screening or awareness of food insecurity among older people as part of professional training and practice. Estes and Binney (1989) discussed how the biomedical model leverages professional activities to self-reinforce the process of biomedicalization of an issue that might have once fallen outside the purview of biomedical-clinical practice.

Taken as a whole, the thematic analyses from the current collection of studies all suggest that there is a strong tendency towards biomedicalization in this literature overall. These tendencies include a heavy emphasis on the aging population, the health and social burdening of older people with food insecurity, the gerontological complexity of this issue relating to non-income factors, and de facto inevitability and homogeneity of aging processes, with an emphasis on individualized and de-politicized solutions to this issue.

To our knowledge, this is the first “literature review” to specifically focus on food insecurity and aging. Although other reports and literature reviews on food insecurity have included studies that include older age groups in the analysis (Gundersen & Ziliak, 2018), this work does not contribute to the same extent to the knowledge base of how aging is relevant to food insecurity research.

Limitations of the current study are mainly those that affect what studies were included or excluded, and thus the major limitation is that the conclusions of this study are provisional. For example, our search strategy was explorative and generative, based on key search terms that were subsequently narrowed. We sought to select the most appropriate set of databases and define the most relevant inclusion and exclusion criteria. We included only studies that were published in English for pragmatic reasons. We did not search the grey literature because the emphasis of our research question focused on the state of the academic literature.

One such collection of grey literature that is of relevance to the issue of food insecurity among older people, but was not included in the current review, is the series of annual research reports on the state of senior hunger in America (Ziliak, Gundersen, & Haist, 2008; Ziliak & Gundersen, 2009, 2011, 2012, 2013a, 2014, 2015, 2016, 2017). These reports, which have been undertaken since

Table 6: Thematic representation of the ways that food insecurity was problematized among older people (themes included individual, interpersonal, and societal level issues that researchers presented as being related to food insecurity among older people)

Individual		
Well-being	Physical Health	Economic
<ul style="list-style-type: none"> • Quality of life • Successful aging • Psychological health (mental and emotional distress, burden) • Capacity to manage daily life (for independent living) 	<ul style="list-style-type: none"> • Health status (nutritional status, disability, health complications) • Health outcomes (morbidity, mortality) 	<ul style="list-style-type: none"> • Economic burden (compromising basic needs, economic distress) • Material hardship
Interpersonal		
<ul style="list-style-type: none"> • Burden (physical, economic, emotional) to caregivers 		
Societal		
Expenditure	Economy	Social Loss
<ul style="list-style-type: none"> • Health care (per capita spending on health care) • Increased health care costs • Skyrocketing Medicare expenditure • Public health costs • Economic burden to health care system • Need for food assistance programs and services 	<ul style="list-style-type: none"> • Decreased productivity • Early retirement • Early institutionalization 	<ul style="list-style-type: none"> • Social inequality

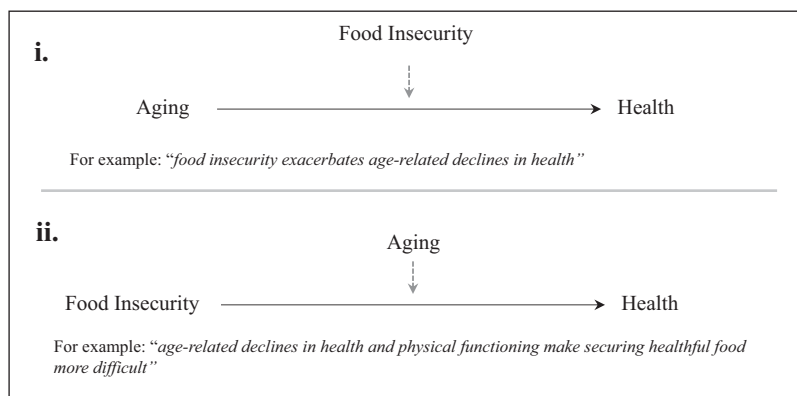


Figure 2: Conceptual representation of how aging and food insecurity tended to be related to health in the rationale of the current collection of studies

2008, draw upon data from the Current Population Survey and offer detailed estimates and risk profiles of food insecurity among older Americans over time, and also outline causes and consequences of food insecurity among older people (Gundersen & Ziliak, 2017; Ziliak, Gundersen, & Haist, 2008; Ziliak & Gundersen 2013b). We mention these reports here but elected not to include them in our review, as they indeed form part of the literature on this issue, but more so as a separate entity of their own. The different reports vary considerably in format, length, and style, which does not render them easily comparable with the peer-review

literature that we did include. However, this collection of reports could be examined from the same angles as has been done in the current review: for example, noting theoretical references, identifying hypothetical mechanisms that connect age to food insecurity, and in turn, discerning normative assumptions that may contribute to the biomedicalization of this issue.

The current review did not focus on reports or studies that examined food insecurity across all ages, but rather focused on studies that specifically featured older people. This inclusion criterion was decided upon because we sought to examine how researchers

Table 7: Thematic representation of how and where study findings were directed (themes included research, policy, services/programs, and professional uptake)

Further Research

- To better understand the issue (community and environmental determinants of health, environmental influences on food insecurity)
- To better capture, measure, or monitor food insecurity among older people (enhanced research methods, measuring and monitoring population rates)

Policy

- Policies and programs beyond charity
- Integrated national food policy
- Public policy development
- Transportation policies

Services or Programs

- Nutrition programs
- Responsive services
- Nutritional interventions
- Targeted interventions
- Nutrition and health care services
- State and federal programs
- Prevention, intervention
- Address cost barriers to accessing medications
- Screening^a
 - To aid referral to social services and government agencies
 - Screening – obesity status not grounds to limit or deny food assistance
 - Food Insecurity – screen for cost-related medication non-adherence
 - Screening for financial difficulty

Professional Role

- Public health – to monitor and advocate government for funding
- Nursing curriculum – to include assessment of food insecurity
- Dietetic practice

^a **Screening was considered to be a sub-category of services and programs, as all of the screening implications were written in the context of services or programs.**

approached age with respect to food insecurity versus describe the problem of food insecurity in different age categories. We determined that studies that included all ages would be much less likely to delve into the ways that aging relates to food insecurity.

Limitations with respect to the thematic analysis we conducted would include the same issues of rigor and transparency that other qualitative studies face, in that this process is subjective despite the involvement of multiple reviewers. It is possible that other researchers would offer different sets of insights from this same collection of literature. Consistent with the established methodologies for undertaking a scoping study and in contrast with systematic review methodologies, we did not appraise the quality of studies that were included. Rather, we necessarily included all studies that met our search criteria, as we sought to comment more broadly on the state of research on this issue. Future directions for

this research are plentiful – but primarily it will be important for people in this area of research to advocate for improved population-level monitoring of food insecurity using standardized survey instruments. The current smattering of ways that food insecurity and older people are operationalized has resulted in an overall collection of literature with limited empirical comparability. Such methodological comparability is essential for international comparisons, and would better allow for researchers to expand the scope of their research from the more microcosmic milieu of risk factors to considering broader cultural, social, and political contexts.

Furthermore, it will be imperative to interrogate the issue of food insecurity among older people as an economic issue, using increasingly sophisticated economic indicators. As food insecurity is better defined as a state as opposed to an outcome, linking different population data sets, and collecting longitudinal data may prove to hold tremendous potential in this regard. Indeed, the absence of comprehensive existing data, and longitudinal data in particular, in many ways limits the ways that food insecurity among older people is examined to static, individual-level parameters.

Moreover, this research could be better served by the application of critical social theories (Estes, Biggs, & Phillipson, 2003). Without engaging with food insecurity and aging more critically, this research will continue to be rooted in biomedicalized, individualized, and de-politicized understandings of why food insecurity is important, and in what ways aging is relevant to its study. Moving forward it will be important for researchers in this area to make explicit their ideological position with respect to food insecurity and aging (Bengtson & Settersten, 2016). For example, our study demonstrates how some research purports universalism with respect to nutritional challenges among older people, in that all older people are at risk of nutritional deficiency just by the fact of being old, and that all older people are vulnerable to food insecurity accordingly. Other research implies that the injustice of food insecurity lies in the differential vulnerability among sub-groups of older people, enacted through inequalities in health-related behaviours and endogenous risk factors for food insecurity. Other research yet focuses on differential access to food assistance, among older people, and compared to younger people.

Few researchers are examining economic inequalities within and among older people. Researchers might clarify whether they view food insecurity among older people as a condition, a health outcome, a predictor of other health outcomes (and expenditures), a proxy or indicator of deprivation, or an injustice in and of itself. To question the acceptability or inevitability of any level of food insecurity in a population or sub-population,

and accordingly the social and political root causes, is reflected in discourse and can be mapped onto research and practice paradigms and the practical implications ascribed therein (Raphael, 2011).

And lastly, this review did not include a chronological component, where studies were assessed unilaterally rather than by publication date. This decision was made early on in the study selection process, as studies were arising from different fields, different countries, and at different points in time. We surmised that disentangling a timeline of publication importance and influence was secondary to our stated objectives. However, as this area of research continues to evolve, it will be important to begin to better understand how disciplinary biases and socio-political, contextual factors have shaped the established research agendas in this field to date.

Conclusion

Overall, in this scoping study we were able to bring together a diverse literature on food insecurity and aging. Several important findings emerged from characterizing our collection of studies methodologically, empirically, and conceptually. Taken together, we found that this literature is missing out on conceptual clarity and a cohesive direction, and this was reflected in the different operationalizations of food insecurity and age, the sparse application of theory, and the thematic analysis of study premise and purpose which demonstrated strong implicit tendencies towards biomedicalization of this issue. We found that this literature could benefit from more deliberate application of concepts and theories from aging scholarship. As discussed, the ways that research is framed and directed has tremendously important bearing on the ways this issue is targeted in future policies and practice.

Note

1 Food insecurity is differentiated from hunger, which is defined as “a physiological state” that describes the “physical pain and discomfort and individual experiences” during a “temporary state”.

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