



BMJ Open Food insecurity among postsecondary international students: a scoping review protocol

Jonathan Amoyaw,¹ Mamata Pandey,² Geoffrey Maina ,³ Yiyang Li ,⁴ Daniel Owusu Nkrumah⁵

To cite: Amoyaw J, Pandey M, Maina G, *et al.* Food insecurity among postsecondary international students: a scoping review protocol. *BMJ Open* 2022;**12**:e060952. doi:10.1136/bmjopen-2022-060952

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2022-060952>).

Received 11 January 2022
Accepted 07 September 2022



© Author(s) (or their employer(s)) 2022. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

¹Department of Sociology and Social Anthropology, Dalhousie University, Halifax, Nova Scotia, Canada

²Research Department, Saskatchewan Health Authority, Regina, Saskatchewan, Canada

³College of Nursing, University of Saskatchewan, Prince Albert, Saskatchewan, Canada

⁴Canadian Critical Care Trials Group, Markheim, Ontario, Canada

⁵Department of Sociology, University of Saskatchewan, Saskatoon, Saskatchewan, Canada

Correspondence to

Dr Yiyang Li;
sociyian.li@utoronto.ca

ABSTRACT

Introduction International students make significant contributions to their host institutions and countries. Yet research shows that not all international students have the financial means to fend for themselves and meet their financial obligations for the entire study programme. Such students are at significant risk of food insecurity. The objective of this scoping review is to synthesise available information on the factors related to food insecurity among international students studying at postsecondary educational institutions and identify the types of food insecurity interventions that have been implemented to address this issue.

Methods and analysis The Joanna Briggs Institute scoping review methodology will be used to guide this scoping review, and we will search the following databases: MEDLINE (through Ovid), CINAHL (EBSCO), PubMed, ERIC (via Ovid), PROSPERO and ProQuest. The titles, abstracts, and subsequently full texts of the selected papers will then be screened against the inclusion criteria. Data from articles included in the review will be extracted using a data charting form and will be summarised in a tabular form. Thematic analysis will be used to identify common themes that thread through the selected studies and will be guided by the steps developed by Terry *et al.* **Ethics and dissemination** Since this project entails a review of available literature, ethical approval is not required. The findings will be presented at academic conferences and published in a peer-reviewed journal. To make the findings more accessible, they will also be distributed via digital communication platforms.

INTRODUCTION

As part of a broader effort to compete for highly skilled immigrants and replace an ageing workforce, several advanced economies are focusing on attracting international students, especially those at the postsecondary level.¹ Between 2010 and 2017, the share of international students increased by two percentage points across the Organisation for Economic Co-operation and Development (OECD) member countries.² Many international students choose to study in English-speaking countries in the OECD, particularly Australia, Canada, the UK and the

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The scoping review will map the existing food insecurity interventions for international students at postsecondary institutions across multiple contexts and provide vital insights that may be tailored to different contexts.
- ⇒ Examining the breadth of literature on factors related to food insecurity among international students would improve the understanding of the pertinent issues in this area and allow for the identification of research gaps that should be addressed in the future.
- ⇒ Relevant studies that are not written in English will be omitted, leading to selection bias.
- ⇒ The effectiveness of the food insecurity interventions will not be assessed in the scoping review.

USA. These four countries attract more than 40% of the international students studying in OECD countries.²

International students contribute significantly to their host institutions and countries. In Australia, for instance, international students contributed about US\$30.3 billion to the economy in 2017.³ International students in Canada also contributed around US\$21.6 billion (via tuition, living expenditures, etc) in 2018 and sustained nearly 170 000 jobs in 2016.⁴ Furthermore, they increase the pool of qualified employees needed to meet the large medium-term and long-term labour shortages in their host countries.⁴ Yet many international students experience financial challenges due to costly tuition, fewer funding opportunities, and limited employment opportunities and social networks.^{5 6}

Studying at a university or college in another country can be a demanding and stressful experience, especially in the initial stages.^{7 8} It requires resilience to adapt to a new learning environment, culture and way of life while juggling academic demands, work and family obligations back home.

These challenges may be exacerbated by financial pressure to cover academic and non-academic expenses such as tuition and rent, by exposure to prejudicial or discriminatory treatment, by limited cooking skills or insufficient time to prepare meals, by limited knowledge about the availability of culturally familiar food and by the need to make food choices without family support.^{6 9} These issues have received extensive examination in the literature because of their potential effect on students' school adjustments, health and food insecurity.¹⁰⁻¹²

Food insecurity, defined broadly as the unreliable availability, use, stability and access to sufficient, culturally safe and nutritious food, is a widespread global problem with considerable health effects.¹³⁻¹⁵ As evidence from Canada and other popular immigrant-destination countries continues to accumulate,^{5 16-20} food insecurity among postsecondary students has been brought to the centre of policy and scholarly discussions. According to a survey on food insecurity among postsecondary students at five Canadian universities, about 39% of students experienced some level of food insecurity.²¹ A systematic review, involving studies about food insecurity on postsecondary campuses in the USA and other countries, suggests that the rate of food insecurity ranges between 12% and 84%.²² In another review that focused exclusively on college students in the USA, the prevalence rate ranged from 10% to 75%.²³ Food insecurity is more common among ethnic minority students because they are more likely to experience structural barriers to getting foods that meet their cultural food needs.^{18 19 21}

Food insecurity severely affects students' health and academic performance. Several studies have found that food insecurity is associated with poor academic performance.^{5 24} Food insecure students tend to experience financial strain and thus are more likely to cut back on food expenses to support other living costs²¹ and to take on survival jobs to supplement their income. Students who must work out of necessity are at risk of being exploited to work illegal hours, in terrible working conditions and often for minimum wage,²⁵ which can harm their health and jeopardise their academic performance. Furthermore, Wright *et al's* work^{19 20} with students at the University of Nevada, Reno, suggests that inadequate availability, access and use of cultural foods, also known as cultural food insecurity, can negatively impact the well-being and identities of international students and students who self-identify as ethnic minorities. Cultural food insecurity reduces an individual's ability to follow their traditional foodways, which can increase the risk of cultural stress and subsequently lead to anxiety, depression, ethnic isolation and identity erosion.^{19 26}

International students may be particularly vulnerable to the harmful effects of food insecurity because they often live in precarious conditions and have restricted access to rights and entitlements generally associated with permanent residence and citizenship.^{5 6} For instance, international students in Canada have limited working hours as part of the conditions of their study permit. They can

work no more than 20 hours per week off campus during regular school semesters.²⁷ Given that many international students experience financial challenges, having limited working hours increases their vulnerability to poverty and food insecurity. In the USA, international students are not eligible to receive public benefits from federal programmes like the Supplemental Nutrition Assistance Programme, which is primarily restricted to citizens and certain non-citizens who are lawfully present in the country.²⁸

This underscores the urgency to address food security issues among international students. There is extensive research exploring the reasons for increased food insecurity among postsecondary students in general.^{5 11} The results have informed initiatives like campus food banks, food pantries and other emergency food assistance programmes at various universities and colleges. Yet there are limited studies that synthesise insights from these studies and identify the different initiatives implemented to address food insecurity, especially for international students. Although there are a few scoping reviews on food insecurity among immigrants and students in post-secondary education,^{17 23 29} these reviews only pay cursory attention to international students' unique issues and experiences because of their broad focus. The proposed scoping review by Shi *et al* is an exception. However, the primary focus of this review is on postsecondary international students' dietary changes, their food insecurity status, and factors affecting their nutrition, academic achievement and health outcomes.³⁰

Against this backdrop, a review of studies on the factors that contribute to food insecurity among post-secondary international students and the types of food insecurity interventions designed to assist their food needs in various contexts is warranted, hence the focus of this scoping review. International students face a myriad of challenges that are unique to their situation. As such, food security initiatives and strategies designed for the broader postsecondary student population may not be suitable for them. Indeed, insights gained from this scoping review are required to better understand the unique challenges international students face and identify gaps in the existing literature for future investigations.

This scoping review will focus on studies conducted in Canada, Europe, Australia, New Zealand and the USA since they are popular study places for international students. By reviewing studies conducted in multiple countries, we can acquire a deeper understanding of the issue and its urgency and gain valuable insights into various strategies that can be tailored to unique contexts and circumstances. This review will be guided by two research questions:

1. What factors have been studied about food insecurity among international students studying at postsecondary educational institutions in Canada, Europe, Australia, New Zealand and the USA?

2. What types of interventions and strategies for addressing food insecurity among postsecondary international students have been documented?

METHODS AND ANALYSIS

The proposed scoping review will apply the Joanna Briggs Institute (JBI) scoping review methodology,³¹ which is based on prior work by Arksey and O'Malley³² and Levac *et al.*³³ Below are the steps for conducting a scoping review based on the JBI guidelines.

Inclusion criteria

To be selected in the review, studies must (1) have postsecondary international students as their target population; (2) focus on food insecurity, operationalised as experiencing hunger or issues with the quality or quantity of food consumed, reducing food intake, seeking food assistance, experiencing disrupted eating patterns and having challenges obtaining culturally appropriate foods; (3) be written in English; (4) be performed in popular places for international students to study, including Canada, Europe, Australia, New Zealand and the USA and (5) be a primary research study employing a quantitative, qualitative or mixed-methods research design. In addition to these criteria, we will also include studies that discuss interventions implemented to address food insecurity among international students. The research team will exclude reviews, letters to the editors and opinion pieces from the review.

Search strategy

A limited search of MEDLINE and CINAHL was conducted to find articles on the topic that were used to help construct the full search strategy. A full search strategy was then constructed based on words found from the titles and abstracts of the identified studies, as well as the index terms used to characterise the studies. Online supplemental appendix 1 details the search strategy for MEDLINE. This strategy will be tailored to each database included in the review. To search for additional studies, the reference lists of all included studies will be screened.

Information sources

With the help of a librarian, we will search for relevant literature from the following electronic databases: MEDLINE (via Ovid), CINAHL (EBSCO), PubMed, ERIC (via Ovid), PROSPERO and ProQuest.

Study selection

Following a thorough search of the specified databases, the retrieved results will be compiled and uploaded to Rayyan, a web-tool for screening and selecting studies for knowledge synthesis.³⁴ All duplicate studies will then be detected and deleted. We will follow a two-step screening process. First, the titles and abstracts of the selected papers will be screened independently by two reviewers to ensure they meet the inclusion criteria. Next, the full texts of the papers that make it through the first screening stage will

be retrieved and carefully vetted by two reviewers against the inclusion criteria. Any disagreements between the reviewers will be addressed through discussion or with the assistance of a third reviewer who will serve as a tie breaker. The search results and study screening and inclusion procedure will be displayed in a Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews flow diagram. The flow diagram will showcase how many records were identified, screened against the inclusion criteria, and included in the review, along with a rationale for exclusion at each stage.³⁵

Data extraction

After the research studies that will be included in the scoping review have been finalised, two reviewers will independently extract data from the studies using a data charting form developed by the research team. The following details will be extracted: (1) author(s); (2) publication year; (3) country where the research was conducted; (4) aims/objectives of the study; (5) study design; (6) intervention; (7) characteristics of the intervention; (8) key findings and (9) gaps identified. The data charting form will be revised during the data extraction process as reviewers deepen their understanding of the research topic.

Data analysis and presentation

The scoping review will include a table summarising the information collected through the data extraction process. The tabulated results will be accompanied by a narrative summary derived through thematic analysis. Thematic analysis will be performed manually on the extracted data using the steps identified by Terry *et al.*³⁶ These include the following:

1. Familiarisation of the data: Once the data extraction has been completed, two researchers will independently read the compilation to gain insight into the data and identify patterns emerging from the initial observation of the data.
2. Coding: In this step, the researchers will make labels using certain segments of the data that are relevant to the research questions. The coding process will be iterative and flexible, allowing for revisions as the analysis progresses.
3. Theme development: In this step, the researchers will separately identify the central organising concepts that are shared across a range of codes. They will then independently combine, cluster or collapse the codes they developed into themes and refine them collaboratively.
4. Reviewing and defining of themes: This is a quality control process in which the researchers will assess the themes to ensure they correspond with the coded data and are relevant to answer the research question.
5. Defining and naming the themes: This step entails telling a story that is based on the data, allowing the research team to interpret the data in a way that is understandable.

6. Producing the report: The researchers will compile the findings of the study using the developed themes.

Patient and public involvement

The study is a scoping review, and hence there are no study participants or patients involved.

DISCUSSION

Instances of international students experiencing financial challenges and food insecurity are well documented.^{5 37} However, their plight may go unnoticed because universities are not required to keep track of international students' well-being statistics. While several strategies have been implemented to address food insecurity among college students, anecdotal evidence suggests that international students may avoid using these services when needed, partly due to the stigma associated with appearing needy and the fear of being deported for struggling to meet their financial obligations. This implies that strategies for promoting food security among international students might differ from those for the general college student population.

To stimulate further discussions about proactive steps to address the issue, synthesising studies on the factors associated with food insecurity among international students and identifying the various support strategies across multiple countries are required. Yet, little progress has been made in this regard. This scoping review will consolidate insights from available studies, identify gaps in existing literature and provide some much-needed information on how to best support vulnerable international students. Relevant food insecurity interventions will be mapped across multiple contexts, which will yield critical insights that can be customised to different contexts.

There are, however, limitations to this review. Although we will map existing food insecurity interventions across multiple contexts, we will not assess their effectiveness in this scoping review. The review also excludes studies that are not written in English. This could lead to selection bias since we might be leaving out relevant studies on this topic. Without those studies, our descriptive account might not be as comprehensive as it could be.

These limitations notwithstanding, the findings of this scoping review could have far-reaching implications for the scholarly community and postsecondary institutions, as well as immigrant service providers and agencies, student associations and local community organisations. Educational institutions, communities and nations that successfully recruit international students have a moral obligation to maintain their well-being because they contribute significantly to the economy and society. Thus, insights from this review may influence how postsecondary institutions and organisations that assist students collaborate to help vulnerable international students. A discussion about better matrices for measuring international students' abilities to fully meet their financial obligations for the duration of their studies may also ensue.

ETHICS AND DISSEMINATION

No ethical approval is required since this study is based on the analysis of published literature. Findings will be presented at conferences and published in a peer-reviewed journal. Digital platforms will be used to disseminate the findings.

Contributors JA conceptualised the idea that led to the development of the scoping review protocol, supported the search strategy development and contributed to other sections of the protocol. MP drafted the background section and edited the protocol. GM wrote the discussion section and edited and proofread the protocol. YL drafted part of the method section and proofread the protocol. DON edited and proofread the protocol.

Funding This research was supported by the Insight Development Grant program of the Social Science and Humanities Research Council (Grant Number 430-2021-00600).

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iDs

Geoffrey Maina <http://orcid.org/0000-0003-4982-9656>

Yiyan Li <http://orcid.org/0000-0001-6372-7600>

REFERENCES

- 1 She Q, Waterspoon T. International student mobility and highly skilled migration: a comparative study of Canada, the United States, and the United Kingdom. *Springerplus* 2013;2:1–14.
- 2 OECD. Education at a glance 2019. Paris OECD Indicators; 2019.
- 3 Department of Education and Training. Research snapshot: export income to Australia from international education activity in 2017. Canberra Australian Government; 2018. <https://internationaleducation.gov.au/research/Research-Snapshots/Documents/Export Income CY 2017.pdf>
- 4 Global Affairs Canada. Building on success: international education strategy 2019–2024. Ottawa Government of Canada; 2019. <https://www.international.gc.ca/education/assets/pdfs/ies-sei/Building-on-Success-International-Education-Strategy-2019-2024.pdf>
- 5 Maynard MS, Meyer SB, Perlman CM, et al. Experiences of food insecurity among undergraduate Students: "You Can't Starve Yourself Through School". *CJHE* 2018;48:130–48.
- 6 Hanbazaza MA. Hunger on campus: A multi-method study of food insecurity among post-secondary students at the University of Alberta [dissertation]. Edmonton University of Alberta; 2016: 248. https://era.library.ualberta.ca/items/53d94dc9-6ac0-42d9-a404-09bed86763e5/view/82d8415c-a771-4daf-9d9b-e8a5d76e0137/Hanbazaza_Mahitab_A_201606_PhD.pdf
- 7 Brown L. The incidence of study-related stress in international students in the initial stage of the International sojourn. *J Stud Int Educ* 2008;12:5–28.
- 8 Brown L, Holloway I. The initial stage of the International sojourn: excitement or culture shock? *Br J Guid Coun* 2008;36:33–49.

- 9 Constantine MG, Anderson GM, Berkel LA, *et al.* Examining the cultural adjustment experiences of African international college students: a qualitative analysis. *J Couns Psychol* 2005;52:57–66.
- 10 Liebkind K, Jasinskaja-Lahti I, Solheim E. Cultural identity, perceived discrimination, and parental support as determinants of immigrants' school adjustments. *J Adolesc Res* 2004;19:635–56.
- 11 Gaines A, Robb CA, Knol LL, *et al.* Examining the role of financial factors, resources and skills in predicting food security status among college students. *Int J Consum Stud* 2014;38:374–84.
- 12 Jung E, Hecht ML, Wadsworth BC. The role of identity in international students' psychological well-being in the United States: A model of depression level, identity gaps, discrimination, and acculturation. *Int J Intercult Relations* 2007;31:605–24.
- 13 Gundersen C, Seligman HK, Ziliak JP. Food insecurity and health outcomes. *Econ Voice* 2017;14:1830–9.
- 14 Kirk SFL, Kuhle S, McIsaac J-LD, *et al.* Food security status among grade 5 students in nova Scotia, Canada and its association with health outcomes. *Public Health Nutr* 2015;18:2943–51.
- 15 Koyanagi A, Stubbs B, Oh H, *et al.* Food insecurity (hunger) and suicide attempts among 179,771 adolescents attending school from 9 high-income, 31 middle-income, and 4 low-income countries: a cross-sectional study. *J Affect Disord* 2019;248:91–8.
- 16 Entz M, Slater J, Desmarais AA. Student food insecurity at the University of Manitoba. *CanFoodStudies* 2017;4:139–59.
- 17 Lee SD, Hanbazaza M, Ball GDC, *et al.* Food insecurity among postsecondary students in developed countries. *BFJ* 2018;120:2660–80.
- 18 Payne-Sturges DC, Tjaden A, Caldeira KM, *et al.* Student hunger on campus: food insecurity among college students and implications for academic institutions. *Am J Health Promot* 2018;32:349–54.
- 19 Wright KE, Lucero JE, Ferguson JK, *et al.* The impact that cultural food security has on identity and well-being in the second-generation U.S. American minority college students. *Food Secur* 2021;13:701–15.
- 20 Wright KE, Lucero JE, Ferguson JK, *et al.* The influence of cultural food security on cultural identity and well-being: a qualitative comparison between second-generation American and international students in the United States. *Ecol Food Nutr* 2021;60:636–62.
- 21 Silverthorn D. *Hungry for knowledge: assessing the prevalence of student food insecurity on five Canadian campuses*. Toronto: Meal Exchange, 2016.
- 22 Bruening M, Argo K, Payne-Sturges D, *et al.* The struggle is real: a systematic review of food insecurity on postsecondary education campuses. *J Acad Nutr Diet* 2017;117:1767–91.
- 23 Nikolaus CJ, An R, Ellison B, *et al.* Food insecurity among college students in the United States: a scoping review. *Adv Nutr* 2020;11:327–48.
- 24 Maroto ME, Snelling A, Linck H. Food insecurity among community college students: prevalence and association with grade point average. *Community Coll J Res Pract* 2015;39:515–26.
- 25 Demand permanent immigration status for migrant workers, refugees and international students: end exploitation and abuse of international students, 2020. TML Wkly Inf Proj
- 26 Vallianatos H, Raine K. Consuming food and constructing identities among arabic and South Asian immigrant women. *Food, Culture & Society* 2008;11:355–73.
- 27 Immigration, Refugees and Citizenship Canada. Work off campus as an international student Government of Canada; 2022. <https://www.canada.ca/en/immigration-refugees-citizenship/services/study-canada/work/work-off-campus.html>
- 28 Vigil A. Trends in supplemental nutrition assistance program participation rates: fiscal year 2010 to fiscal year 2017 Mathematica; 2019.
- 29 Maynard M, Dean J, Rodriguez PI, *et al.* The experience of food insecurity among immigrants: a scoping review. *J Int Migr Integr* 2019;20:375–417.
- 30 Shi Y, Lukomskyj N, Allman-Farinelli M. Food access, dietary acculturation, and food insecurity among international tertiary education students: a scoping review protocol. *JBI Evid Synth* 2020;18:2090–7.
- 31 The Joanna Briggs Institute. *Methodology for JBI scoping reviews*. Joanne Briggs Inst, 2015: 24.
- 32 Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol* 2005;8:19–32.
- 33 Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implement Sci* 2010;5:69.
- 34 Ouzzani M, Hammady H, Fedorowicz Z, *et al.* Rayyan-a web and mobile APP for systematic reviews. *Syst Rev* 2016;5:210.
- 35 Tricco AC, Lillie E, Zarin W, *et al.* PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med* 2018;169:467–73.
- 36 Terry G, Hayfield N, Clarke V. Thematic analysis. In: Willig C, Stainton Rogers W, eds. *The SAGE Handbook of qualitative research in psychology*. London: Sage, 2017: Chapter 2. 17–37.
- 37 Calder MJ, Richter MS, Mao Y, *et al.* International students attending Canadian universities: their experiences with housing, finances, and other issues. *CJHE* 2016;46:92–110.

Searching Strategy of MEDLINE (Ovid)

The following searches were performed in May, 2022.

Keywords	Steps	Search	Results
International Students	1	exp International Educational Exchange/ or exp Students/	157249
	2	international student*.mp.	1008
	3	foreign student*.mp.	309
	4	overseas student*.mp.	87
	5	student* abroad.mp.	41
	6	ethnic student*.mp.	35
	7	sojourner*.mp.	169
	8	transnational migrant*.mp.	32
	9	Migrant student*.mp.	38
	10	Student mobility.mp.	64
	11	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10	158122
Food insecurity	12	exp food insecurity/ or exp access to healthy foods/	935
	13	food insecurity.mp.	6193
	14	food security.mp.	10431
	15	food access.mp.	1242
	16	food availability.mp.	4438
	17	food stability.mp.	42
	18	Food utili*ation.mp.	452
	19	Hunger.mp.	13203
	20	Ethnic food.mp.	61
	21	food supply.mp.	18819
	22	food accessibility.mp.	139
	23	cultural food.mp.	94
	24	food quality.mp.	7103
	25	food quantity.mp.	249
	26	food poverty.mp.	90
	27	food scarcity.mp.	318
	28	food loss.mp.	186
	29	loss of food.mp.	438
	30	access to food.mp.	2431
	31	food instability.mp.	5
	32	food insufficiency.mp.	176
	33	food desert.mp.	165
	34	food swamp.mp.	20
	35	food apartheid.mp.	0
	36	food hardship.mp.	18
	37	food sovereignty.mp.	118

	38	food capacity.mp.	5
	39	"food use".mp.	418
	40	cuisine.mp.	796
	41	foodways.mp.	83
	42	foodscape.mp.	54
	43	regional food.mp.	161
	44	traditional food.mp.	1090
	45	national dish.mp.	4
	46	food shed.mp.	2
	47	country food.mp.	80
	48	culturally appropriate food*.mp.	39
	49	culturally acceptable food*.mp.	19
	50	culturally accepted food*.mp.	4
	51	culturally preferred food*.mp.	3
	52	culturally satisfying food*.mp.	0
	53	preference of food*.mp.	260
	54	food system*.mp.	3582
	55	food practice*.mp.	384
	56	food procurement*.mp.	166
	57	food preparation*.mp.	2294
	58	food knowledge*.mp.	175
	59	traditional food*.mp.	1645
	60	indigenous food*.mp.	163
	61	native food*.mp.	111
	62	food culture*.mp.	378
	63	culinary heritage*.mp.	9
	64	food choice*.mp.	5766
	65	dietary choice*.mp.	1053
	66	dietary acculturation.mp.	108
	67	traditional diet*.mp.	1099
	68	traditional eating.mp.	63
	69	food allocation*.mp.	68
	70	food adequacy.mp.	10
	71	adequate food*.mp.	550
	72	nutritional adequacy.mp.	786
	73	emergency food*.mp.	203
	74	Food stress.mp.	126
	75	Food hardship*.mp.	21
	76	12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or	70424

		52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65 or 66 or 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74 or 75	
Post-Secondary Education	77	Post-secondary education.mp.	502
	78	Universit*.mp.	461892
	79	College*.mp.	136524
	80	Polytechnic*.mp.	610
	81	Campus*.mp.	12199
	82	Higher education*.mp.	20262
	83	tertiary education*.mp.	1534
	84	third-level.mp.	1873
	85	third-stage.mp.	5655
	86	graduate.mp.	70932
	87	undergraduate.mp.	60815
	88	trade school*.mp.	99
	89	technological universit*.mp.	74
	90	vocational school*.mp.	644
	91	technical school*.mp.	354
	92	vocational college*.mp.	66
	93	77 or 78 or 79 or 80 or 81 or 82 or 83 or 84 or 85 or 86 or 87 or 88 or 89 or 90 or 91 or 92	685285
Intervention	94	intervention*.mp.	1246971
	95	Food bank*.mp.	301
	96	Food assistance.mp.	2029
	97	Food stamp*.mp.	390
	98	food pantry.mp.	175
	99	food shel*.mp.	273
	100	nutrition education*.mp.	5499
	101	(Special Supplemental Nutrition Program for Women, Infants, and Children).mp.	757
	102	Supplemental Nutrition Assistance Program.mp.	652
	103	Electronic Benefits Transfer.mp.	17
	104	The Emergency Food Assistance Program.mp.	4
	105	soup kitchen.mp.	48
	106	mobile pantry.mp.	2
	107	mobile food*.mp.	92
	108	food deliver*.mp.	896
	109	94 or 95 or 96 or 97 or 98 or 99 or 100 or 101 or 102 or 103 or 104 or 105 or 106 or 107 or 108	1253717
Final	110	11 and 76 and 93 and 109	158