

REVIEW ARTICLE

Understanding the neighbourhood environment and the health and wellbeing of older Chinese immigrants: a systematic literature review

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Abstract

Neighbourhood environment has a significant impact on the health and wellbeing of older people. In recent years, the increase in older Chinese immigrants globally has attracted a growing amount of research which has investigated the health and wellbeing of these elderly residents. The aim of this study is to provide a systematic literature review of empirical findings on the health and wellbeing of older Chinese immigrants and the ways in which the neighbourhood environment impacts them. A systematic search was conducted using online databases where 52 articles met specific criteria and were subsequently reviewed critically. An inductive approach was undertaken to analyse the data extracted from the selected articles. The review was categorised according to the following themes: neighbourhood social environment, neighbourhood physical environment and place attachment. The findings show that the majority of research has investigated the health status of older immigrants, and in particular, the impacts related to the social environments in which they live. The literature review indicated that there is scope for future studies to investigate the impact of the physical neighbourhood environment on this group of people.

Keywords: neighbourhood environment; health and wellbeing; older Chinese immigrants

Introduction

The rising number of international migrants has emerged as a significant demographic structural change worldwide. China provided the fourth largest number of international migrants (11 million) globally in 2017 (United Nations, 2017). The popular destination countries for Chinese migrants are mostly Western developed countries, such as the United States of America (USA), Canada and Australia (Figure 1), where international immigrants account for a high percentage of the total population (14.4, 21.9 and 28.6%, respectively). The Chinese population was the only group to appear among the five largest ethnic groups in these three countries (Migration Policy Institute, 2018). Although the main proportion of

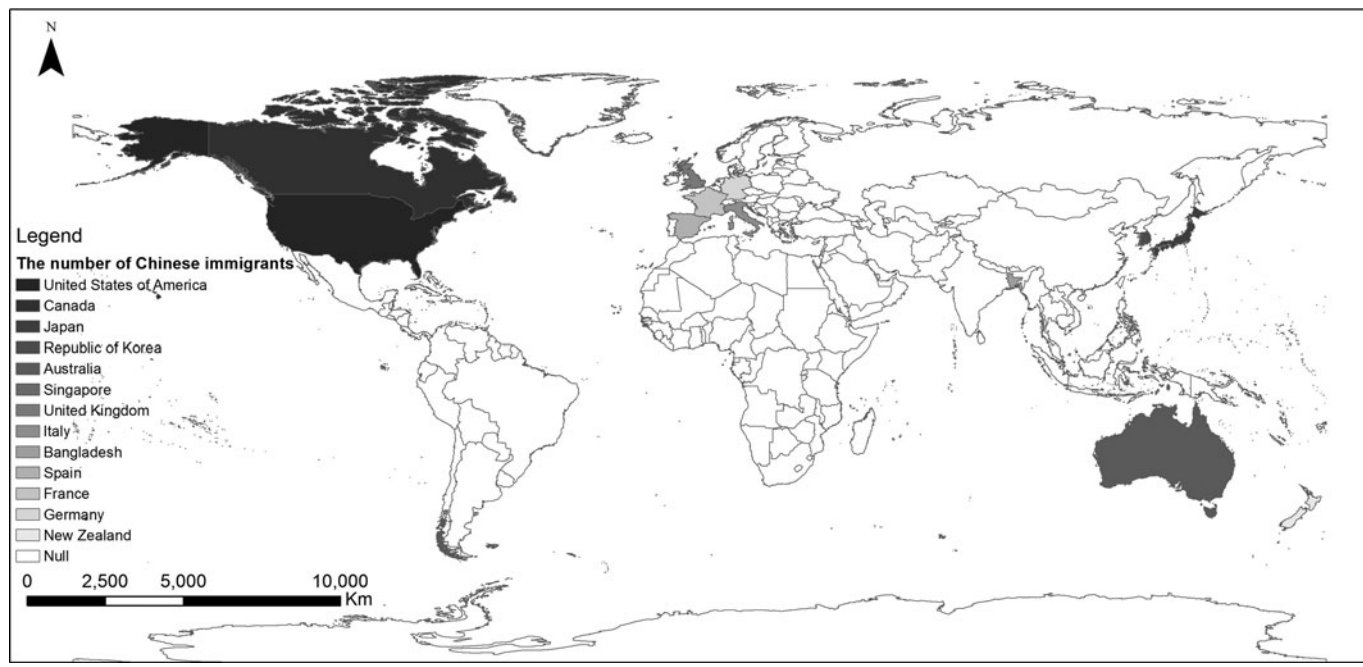


Figure 1. Countries where large numbers of Chinese immigrants reside.
Source: United Nations, December 2018 (<http://www.un.org/en/development/desa/population/migration/data/>).

international immigrants (74%) are working age (United Nations, 2017), due to population ageing and parents joining their immigrant adult children, older Chinese immigrants are a fast-growing, rapidly ageing minority group (Lai, 2004).

With the changes of demographic structure, it is worthwhile considering the health and wellbeing of these specific populations as they face challenges that their local cohort do not. Older Chinese immigrants, as an ethnic minority group, often are regarded as the most vulnerable population (Lai and Chau, 2007a). Language limitations and transportation barriers are two main factors that lead to less mobility and incapacity to integrate into the new place of residence (Ip *et al.*, 2007). They are generally socially isolated and at high risk of mental diseases in comparison with their counterparts in the new place of residence (Abbott *et al.*, 2003). At the same time, older Chinese immigrants experience higher levels of functional limitations than their counterparts in China (Wu *et al.*, 2011), which significantly impact the quality of life of these older immigrants.

In recent decades, policy makers and researchers have paid growing attention to how a neighbourhood environment correlates to the health and wellbeing of older residents (Wiles *et al.*, 2009; Parra *et al.*, 2010; Mathis *et al.*, 2015; Loo *et al.*, 2017). Despite these significant developments, only a very small number of these studies have focused on ethnic minority groups (Bird *et al.*, 2009). Health and wellbeing has been a predominant topic in the analysis of older immigrants, which has attracted increasing scholarly attention in the field of medical, psychological and social science. Since health and wellbeing is becoming an important topic in geography (Cutchin, 2007), this research is drawn from a human geography perspective and aims to understand the relationship between the neighbourhood environment and the health and wellbeing of older Chinese immigrants.

Living in familiar homes and communities is favoured by older people because it maintains their autonomy, independence, and connection with family and friends (World Health Organization, 2007), thus many older people choose to live in their homes as long as possible before moving to aged-care facilities. This means that older people living independently account for a large proportion of the total aged population. Therefore, older Chinese immigrants who live or lived independently is the target group in this research. Older Chinese immigrants are less resilient to dramatic changes in their living environments after migrating. The most significant change many confront is the unfamiliar and often contradictory everyday living experience in their new place of residence. Understanding the relationship between the environment and the individual's wellbeing will provide opportunities for urban planners to intervene and establish necessary support structures to improve the health and wellbeing of older Chinese immigrants.

Interestingly, although a number of studies have investigated the neighbourhood, there is still no consensus definition on what 'neighbourhood' means (Young *et al.*, 2004; McNeill *et al.*, 2006; Flowerdew *et al.*, 2008; Buffel *et al.*, 2012; Alidoust *et al.*, 2017). Neighbourhood physical and social environments can provide a full picture of the whole environment. The physical environment refers to the geographic area which comprises the natural and built aspects of neighbourhoods (Ball, 2012). The social environment is understood as communication networks, social engagement and social norms (McNeill *et al.*, 2006; Castree *et al.*, 2013; Shaw *et al.*, 2017). Reviewing literature according to these different dimensions of neighbourhood

environment promotes a deeper understanding on this complex topic and offers insights for policy makers and those engaged in planning, designing and building inclusive neighbourhoods that foster health and wellbeing.

Previous review studies investigate how neighbourhood environment aspects, such as physical (Cunningham and Michael, 2004; Van Cauwenberg *et al.*, 2011; Barnett *et al.*, 2017; Cerin *et al.*, 2017; Tuckett *et al.*, 2018), social (Cattan *et al.*, 2005; Julien, 2012) and safety (Won, 2016) shape the health and wellbeing of older adults. However, older immigrants, who account for an increasing proportion of older people, are largely ignored in these reviews. With the increase in the number of studies exploring associations between neighbourhood environments and health and wellbeing of older Chinese immigrants, it would be timely to pause and review the existing literature to identify gaps, trends and contradictions.

This research critically reviews the effects neighbourhood social and physical environments have on older Chinese immigrants, with the aim of mapping what we know about these topics, and highlighting gaps and opportunities for further research. This review provides a more comprehensive understanding of the role the neighbourhood environment plays in the lives of older, ethnic minority immigrant groups. The paper begins by reviewing the health and wellbeing status of immigrants. The next section outlines the systematically quantitative literature review method. This is followed by a review of the current literature relating to the changes in social and physical environments within neighbourhoods which affect older Chinese immigrants, and the ways in which these changes influence their health and wellbeing. Finally, future research directions are discussed.

Health and wellbeing of older Chinese immigrants

The health and wellbeing status of immigrants has attracted the interests of many governments and scholars. Table 1 compares the three largest health problems (diabetes, hypertension and physical inactive) (Chiu *et al.*, 2010; Bloom and Black, 2016; Jin *et al.*, 2017) among Chinese immigrants and the overall population in the USA, Canada and Australia. The results show that compared to the overall population, Chinese immigrants have a similar rate of diabetes. However, the rate of Chinese immigrants who have hypertension is higher than their local counterparts, and Chinese immigrants are physically less active than other local groups. These data indicate that more attention needs to be paid to the health status of Chinese immigrants.

In this review, health and wellbeing are always coupled together, representing a complete state of physical, mental and social wellbeing (World Health Organization, 2007). Older Chinese immigrants warrant more attention to their health and wellbeing, as they are less resilient, less likely to adapt to changes and potentially exposed to more challenges in their local environment (Chow, 2010; Tsoh *et al.*, 2016). Previous studies have used health assessment scales to measure health and wellbeing status. These assessments include (a) health-related quality of life (Kwon *et al.*, 2015); (b) Medical Outcomes Study Short Form (SF-36; Mui *et al.*, 2007); (c) four wellbeing indicators: depression, anxiety, loneliness and quality of life (Lin *et al.*, 2016); and (d) self-rated health (Chow, 2010; Tsoh *et al.*, 2016). The results of these assessment tools show that older Chinese immigrants are

Table 1. Health status of Chinese immigrants in the United States of America (USA), Canada and Australia

	Diabetes		Hypertension		Physically active	
	Chinese immigrants	Local population	Chinese immigrants	Local population	Chinese immigrants	Local population
	<i>Percentages</i>					
USA	9	15.9	33	24	30.1	33.9
Canada	4.3	4.2	15.0	13.7	17.9	21
Australia	9.3	9	28.8	37	65.2	74.3

Source: Bloom and Black (2016); Chiu *et al.* (2010); Jin *et al.* (2017).

more likely to, one, rate their health as poor, and two, suffer from depressive symptoms and loneliness (Tsoh *et al.*, 2016).

Previous research focused on the health and wellbeing measurement tools rather than the impact of neighbourhood environments in shaping the health and wellbeing of this group of people. Among the reviewed studies, the provision of health-care services, which can be regarded as one element of neighbourhood environments, has been the attention of some scholars and policy makers. Poor health and wellbeing among older Chinese immigrants is often linked to their under-utilisation of the health-care system and social services (Miltiades and Wu, 2008). Lai and Chau (2007a) suggested that older Chinese immigrants refrain from accessing health and social service providers due to: language barriers, transportation, service costs, long waiting times for appointments and treatments, cultural norms/value impediments between service providers, fear, traditional folk medicines and the lack of knowledge about health-care services. Research on the use of health services and the effects this has on the health and wellbeing of users currently has not been translated into policy. In the USA, Canada and Australia, no health and wellbeing-related policies specifically relating to older immigrants are available. Most public health systems only cover individuals who have permanent residency.

Research methods

A systematic quantitative literature review method was undertaken to collect and analyse secondary data for this research. This approach contrasts with the more traditional narrative literature review, in which authors use their own understanding of the subject matter to select and judge representative literature. This more traditional review emphasises what is known, rather than what is unknown. The narrative literature review method used for literature selection is internalised and selective, rather than being standardised, reproducible and transparent in comparison with a systematic literature review (Petticrew and Robert, 2006). This systematic quantitative method addresses publication bias, and is used for the collection of literature that is explicit and reproducible (Pickering *et al.*, 2015). The systematic literature review method provides a framework on which to organise the literature systematically, making the review ideal for multi-disciplinary research. Although this method is suitable for use in quite narrowly defined research questions, the result of such a systematic review can be comprehensive (Kamler, 2008).

Literature searches for this study were conducted between November 2017 and February 2018, using scholarly electronic databases (ScienceDirect, ProQuest, Web of Science and Google Scholar) to identify original research papers. Only articles published after the year 2000 were sought in order to identify recent trends. The search topic for this review focused on the 'health and wellbeing', as already defined, of older Chinese immigrants. According to the research background and question, the keywords used for the search were grouped into two categories: ageing population (older people, elderly, older adults) and Chinese immigrants. Additional sources were also identified from the reference lists included in the selected papers.

A two-step inclusion process was applied to review the identified literature. Firstly, article titles were screened and examined to exclude non-relevant articles.

Secondly, article abstracts were reviewed for relevant content based on the following three criteria: (a) original research papers published in peer-reviewed English-language science journals, (b) the aimed cohorts must be older Chinese immigrants, and (c) the study focused on the health and wellbeing of older people who lived independently. An initial keyword search identified around 885 articles. After removing irrelevant and duplicated articles and screening the titles, 172 papers were selected for abstract evaluation. Excluding the articles which were not related to the topic of neighbourhood environment and health and wellbeing, 52 articles were finally critically reviewed (Table 2). Some limitations were identified in this method. All the research papers included in this review were in English. The omission of relevant articles published in other languages, especially Chinese, may influence the findings of this review. Moreover, only including peer-reviewed articles published in scholarly journals meant that other literature, like grey literature, book chapters and conference papers, were excluded. While these limitations may influence the depth of the findings, the significance of this review lies in its generalisation and transferability.

Data were then entered into an Excel spreadsheet and analysed using the following categories: author, year of publication, article title, journal name, the country in which the study was located, study design, the aim of the study, methods, sample size and outcome. The literature review search found that older Chinese immigrants attracted diverse scholarly interest in countries which attracted large numbers of immigrants. The majority of studies ($N = 35$) were conducted in North America, of which 24 were within the USA and 11 were located in Canada. Nine studies were found in Australia, three in New Zealand and two in the United Kingdom. Two studies were multinational, covering the USA and China.

Critically reviewed papers were published in 42 different journals spanning a wide range of disciplines, which demonstrates a trans-disciplinary interest in the topic and amongst which *Ageing & Society* published the highest number of articles ($N = 4$). Two fields, in particular, were dominant: health and social work. Nearly half of the journals concentrated on health-related issues ($N = 17$) (*American Journal of Public Health (AJPH)*, *Australian Journal of Primary Health*, *Contemporary Nurse*, *Ethnicity & Health*, *Health & Social Work*, *Health Education & Behavior*, *Health Expectations*, *International Journal of Public Health*, *International Journal of Qualitative Studies on Health and Well-being*, *International Psychogeriatrics*, *Journal of Community Health*, *Journal of Health Psychology*, *Journal of Immigrant and Minority Health*, *Public Health Nursing*, *Research in Nursing & Health*, *Social Science & Medicine*, *Social Work in Public Health*). Twelve journals focused on social aspects (*Ageing & Society*, *International Journal of Social Welfare*, *Journal of Community & Applied Social Psychology*, *Journal of Family Issues*, *Journal of Gerontological Social Work*, *Journal of Human Behavior in the Social Environment*, *Journal of Intergenerational Relationships*, *Journal of Social Work*, *Journal of the American Geriatrics Society*, *Management Research News*, *Social Indicators Research*, *Social Work*). For the remainder of the articles, seven concentrated on ageing (*Activities, Adaptation & Aging*, *Aging & Mental Health*, *Canadian Journal on Aging*, *Journal of Aging and Health*, *Journal of Aging and Physical Activity*, *Journal of Religion, Spirituality & Aging*, *International Journal of Aging and Human*

Table 2. General characteristics and methodological aspects of the included articles

General characteristics	No. of articles	Study reference	Journal
Country:			
USA	24	Lan (2002); Pang <i>et al.</i> (2003); Aroian <i>et al.</i> (2005); Wong <i>et al.</i> (2006, 2005, 2007); Lee (2007); Mui <i>et al.</i> (2007); Chiang and Sun (2009); Parikh <i>et al.</i> (2009); Chun <i>et al.</i> (2011); Dong <i>et al.</i> (2012a, 2012b, 2014); Kang <i>et al.</i> (2012); Lin <i>et al.</i> (2014); Wyatt <i>et al.</i> (2014); Kim <i>et al.</i> (2015, 2017); Kwon <i>et al.</i> (2015); Tsoh <i>et al.</i> (2016); Dong and Chang (2017); Hei and Dong (2017); Zhan <i>et al.</i> (2017)	<i>American Journal of Public Health (AJPH)</i> ; <i>Archives of Gerontology and Geriatrics</i> ; <i>Clinical Gerontologist</i> ; <i>Ethnicity & Health</i> ; <i>Gerontology</i> ; <i>Health Education & Behavior</i> ; <i>Health & Social Work</i> ; <i>International Journal of Aging and Human Development</i> ; <i>Journal of Aging and Health</i> ; <i>Journal of Community Health</i> ; <i>Journal of Cross-cultural Gerontology</i> ; <i>Journal of Family Issues</i> ; <i>Journal of Human Behavior in the Social Environment</i> ; <i>Journal of Intergenerational Relationships</i> ; <i>Journal of Religion, Spirituality & Aging</i> ; <i>Journal of Social Work</i> ; <i>Journal of the American Geriatrics Society</i> ; <i>Journals of Gerontology</i> ; <i>Public Health Nursing</i> ; <i>Research in Nursing & Health</i> ; <i>Social Science & Medicine</i> ; <i>Social Work in Public Health</i> ; <i>The Gerontologist</i>
Canada	11	Lai and Chau (2007a, 2007b); Chow (2010, 2012); Chau and Lai (2011); Tieu and Konnert (2014, 2015); Da and Garcia (2015); Luo (2016); Luo and Menec (2018)	<i>Activities, Adaptation & Aging</i> ; <i>Aging & Mental Health</i> ; <i>Canadian Journal on Aging</i> ; <i>Ethnicity and Health</i> ; <i>Health & Social Work</i> ; <i>Journal of Cross-cultural Gerontology</i> ; <i>Journal of Gerontological Social Work</i> ; <i>Journal of Immigrant and Minority Health</i> ; <i>Social Indicators Research</i> ; <i>Social Work</i>
Australia	9	Ip <i>et al.</i> (2007); Lo and Russell (2007); Koo (2011); Lin <i>et al.</i> (2016, 2017); Tan <i>et al.</i> (2010); Tsang <i>et al.</i> (2004); Mariño <i>et al.</i> (2012); Leung (2002)	<i>Ageing & Society</i> ; <i>Australian Journal of Primary Health</i> ; <i>Contemporary Nurse</i> ; <i>International Journal of Public Health</i> ; <i>International Psychogeriatrics</i> ; <i>Journal of Aging and Physical Activity</i> ; <i>Journal of Health Psychology</i>
New Zealand	3	Selvarajah (2004); Li <i>et al.</i> (2010, 2014)	<i>Journal of Community & Applied Social Psychology</i> ; <i>Journal of Health Psychology</i> ; <i>Management Research News</i>

(Continued)

Table 2. (Continued.)

General characteristics	No. of articles	Study reference	Journal
United Kingdom	3	Chau and Yu (2010); Liu et al. (2014, 2015)	<i>Ageing & Society; Health Expectations; International Journal of Qualitative Studies on Health and Well-being</i>
USA and China	2	Miltiades and Wu (2008); Wu et al. (2011)	<i>International Journal of Social Welfare; Social Science & Medicine</i>
Data collection method:			
Quantitative method	30	Leung (2002); Selvarajah (2004); Lai and Chau (2007a); Lai et al. (2007); Lee (2007); Mui et al. (2007); Wong et al. (2007); Miltiades and Wu (2008); Chiang and Sun (2009); Parikh et al. (2009); Chow (2010, 2012); Chau and Lai (2011); Wu et al. (2011); Mariño et al. (2012); Lai and Surood (2013); Dong et al. (2014); SM Lin et al. (2014); Tieu and Konnert (2014, 2015); Wyatt et al. (2014); Kim et al. (2015, 2017); Kwon et al. (2015); Tsoh et al. (2016); Dong and Chang (2017); Hei and Dong (2017); X Lin et al. (2017); Luo and Menec (2018)	<i>Ageing & Society; Aging and Mental Health; American Journal of Public Health; Australian Journal of Primary Health; Canadian Journal on Aging; Clinical Gerontologist; Ethnicity and Health; Gerontology; Health & Social Work; Health Education & Behaviour; International Journal of Public Health; International Journal of Social Welfare; International Psychogeriatrics; Journal of Aging and Health; Journal of Community Health; Journal of Cross-cultural Gerontology; Journal of Human Behavior in the Social Environment; Journal of Immigrant and Minority Health; Journal of Religion, Spirituality & Aging; Journal of Social Work; Management Research News; Public Health Nursing; Social Indicators Research; Social Science & Medicine; Social Work in Public Health</i>
Qualitative method	20	Pei-Chia (2002); Pang et al. (2003); Tsang et al. (2004); Aroian et al. (2005); Wong et al. (2005, 2006); Lo and Russell (2007); Chau and Yu (2010); Li et al. (2010, 2014); Tan et al. (2010); Chun et al. (2011); Koo (2011); Dong et al. (2012b); Liu et al. (2014, 2015); Da and Garcia (2015); Lin et al. (2016);	<i>Activities, Adaptation & Aging; Ageing & Society; Contemporary Nurse; International Journal of Aging & Human Development; International Journal of Qualitative Studies on Health and Well-being; International Psychogeriatrics; Health Expectations; Journal of Aging and Physical Activity; Journal of Community & Applied Social Psychology; Journal of Cross-cultural Gerontology</i>

(Continued)

Table 2. (Continued.)

General characteristics	No. of articles	Study reference	Journal
		Luo (2016); Zhan <i>et al.</i> (2017)	<i>Research in Nursing & Health; Journal of Family Issues; Journal of Health Psychology; Journal of Gerontological Social Work; Journal of Intergenerational Relationships; Journals of Gerontology; Social Science & Medicine; The Gerontologist</i>
Mixed method	2	Dong <i>et al.</i> (2012a); Ip <i>et al.</i> (2007)	<i>Ageing & Society; Archives of Gerontology and Geriatrics</i>
Topic:			
Health	14	Leung (2002); Lai <i>et al.</i> (2007); Lee (2007); Mui <i>et al.</i> (2007); Chow (2010); Dong <i>et al.</i> (2012a, 2014); Mariño <i>et al.</i> (2012); SM Lin <i>et al.</i> (2014); Wyatt <i>et al.</i> (2014); Kwon <i>et al.</i> (2015); X Lin <i>et al.</i> (2016); Tsoh <i>et al.</i> (2016); Kim <i>et al.</i> (2017)	<i>American Journal of Public Health (AJPH); Archives of Gerontology and Geriatrics; Australian Journal of Primary Health; Canadian Journal on Aging; Clinical Gerontologist; Ethnicity and Health; Health & Social Work; Health Education & Behavior; International Journal of Public Health; International Psychogeriatrics; Journal of Aging and Health; Journal of Community Health; Journal of Religion, Spirituality & Aging; Social Work in Public Health</i>
Health-related behaviour	12	Pang <i>et al.</i> (2003); Aroian <i>et al.</i> (2005); Lai and Chau (2007a, 2007b); Miltiades and Wu (2008); Chiang and Sun (2009); Parikh <i>et al.</i> (2009); Chau and Yu (2010); Chow (2012); Liu <i>et al.</i> (2014, 2015); Tieu and Konnert (2014)	<i>Ageing & Society; Aging & Mental Health; Health & Social Work; Health Expectations; International Journal of Qualitative Studies on Health and Well-being; Journal of Community Health; Public Health Nursing; Research in Nursing & Health; Social Indicators Research; Social Science & Medicine; Social Work; The Gerontologist</i>
Social environment	17	Selvarajah (2004); Tsang <i>et al.</i> (2004); Wong <i>et al.</i> (2005, 2007); Ip <i>et al.</i> (2007); Chau and Lai (2011); Chun <i>et al.</i> (2011); Wu <i>et al.</i> (2011); Kang <i>et al.</i> (2012); Li <i>et al.</i> (2014); Da and Garcia (2015); Kim <i>et al.</i> (2015); Tieu and Konnert (2015);	<i>Activities, Adaptation & Aging; Ageing & Society; Canadian Journal on Aging; Ethnicity & Health; Gerontology; International Journal of Aging and Human Development; International Journal of Social Welfare; Journal of Community & Applied Social Psychology; Journal of Cross-cultural</i>

(Continued)

Table 2. (Continued.)

General characteristics	No. of articles	Study reference	Journal
		Luo (2016); Dong and Chang (2017); Hei and Dong (2017); Luo and Menec (2018)	<i>Gerontology</i> ; <i>Journal of Gerontological Social Work</i> ; <i>Journal of Human Behavior in the Social Environment</i> ; <i>Journal of Immigrant and Minority Health</i> ; <i>Journal of Social Work</i> ; <i>Journal of the American Geriatrics Society</i> ; <i>Management Research News</i> ; <i>Social Science & Medicine</i>
Family relationship	5	Pei-Chia (2002); Wong et al. (2006); Lo and Russell (2007); Dong et al. (2012b); Lin et al. (2017)	<i>Ageing & Society</i> ; <i>Contemporary Nurse</i> ; <i>Journal of Family Issues</i> ; <i>Journal of Intergenerational Relationships</i> ; <i>Journals of Gerontology</i>
Sense of home	2	Li et al. (2010); Zhan et al. (2017)	<i>Journal of Cross-cultural Gerontology</i> ; <i>Journal of Health Psychology</i>
Perceptions on ageing	2	Tan et al. (2010); Koo (2011)	<i>Journal of Aging and Physical Activity</i> ; <i>Journal of Health Psychology</i>

Note: USA: United States of America.

Development) and six came from journals focusing on gerontology (*Archives of Gerontology and Geriatrics*, *Clinical Gerontologist*, *Gerontology*, *Journal of Cross-cultural Gerontology*, *The Gerontologist*, *Journals of Gerontology*). In this research, none of the journals were found to have published articles relating to urban studies, planning or geography.

Research topics

An increase in the number of Chinese immigrants globally has posed more challenges, not only for the issue of health but also for the environment in which they live (International Organization for Migration, 2018). The steadily increased number in the calculation of literature every five years shows that the research on this group of people has been becoming an increasingly popular topic since 2000 (Figure 2). From 2001 to 2005, three papers concentrated on health problems, three papers studied the social environment and one article focused on family relationships of older Chinese immigrants. Between 2006 and 2010, figures for papers that were published on issues relating to health increased to ten, while three articles focused on social relationships. As for family relationships, sense of home and perceptions on ageing among older Chinese immigrants, each had one article that researched these topics. From the year 2011 to 2015, ten articles concentrated on the issues of health, while research on social environment increased dramatically, showing that seven articles researched social relationships, two articles focused on family relationships and one article concentrated on the perceptions of ageing.

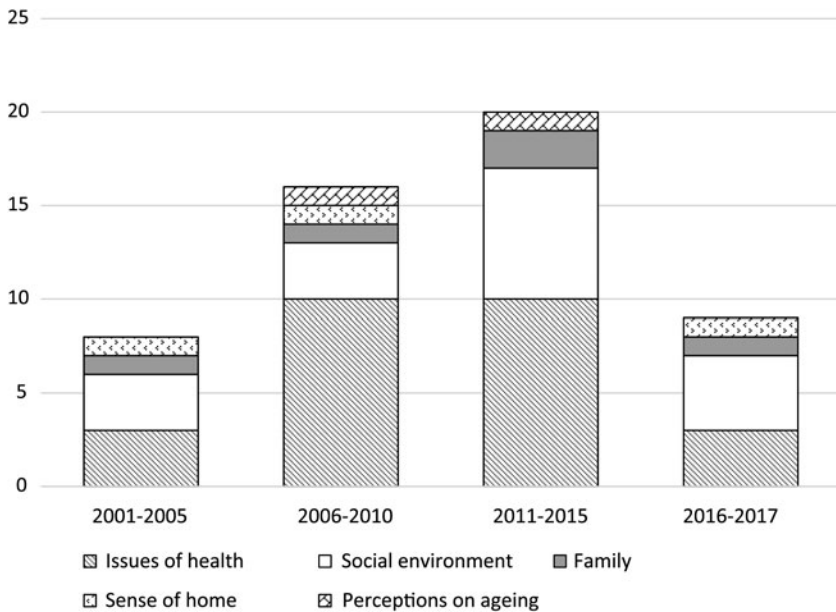


Figure 2. Numbers of articles on different topics.

Finally, in 2016 and 2017, four articles concentrated on the social relationships of older Chinese immigrants and three articles investigated health issues. There was only one article that focused on family relationships and one article that investigated the sense of home of older Chinese immigrants.

The relationship between the social environment and health and wellbeing

The neighbourhood social environment has been conceptualised as the interaction of local residents. Social networks (Tieu and Konnert, 2014; Park *et al.*, 2015) and neighbourhood engagement (Luo and Menec, 2018) are two dominant themes in the social environment body of literature. Although migration enables older immigrants to reunite with their children, they also face the loss of connection with their friends and neighbours in their home countries (Ryan *et al.*, 2009). Seventeen of the reviewed studies have critically analysed social networks, and found the existence of severe social pressures (*e.g.* small social network, restricted social participation, social isolation and loneliness) among this group (Ip *et al.*, 2007; Wu *et al.*, 2011; Kim *et al.*, 2015; Luo, 2016; Dong and Chang, 2017; Luo and Menec, 2018).

Social networks refer to the web of interpersonal relationships with family, friends and neighbours. Previous research argued that older Chinese immigrants had small and family-oriented social networks (Dong and Chang, 2017; Luo and Menec, 2018). Heavy domestic responsibilities, limited English proficiency and restricted mobility in a foreign country are factors that influence older Chinese immigrants in building social networks, which then influence the sense of wellbeing and social inclusion experienced by this group (Ip *et al.*, 2007; Diwan, 2008; Da and Garcia, 2015; Luo, 2016).

Family relations comprise a large proportion of social networks of older Chinese immigrants (Dong and Chang, 2017). Filial piety is deeply valued in Eastern culture (Lo and Russell, 2007), and adult children generally have responsibilities outside the home and they frequently play core roles in providing informal care to their parents, including financial, instrumental and emotional support (Wong *et al.*, 2005; Wu *et al.*, 2011; Dong *et al.*, 2012b). Five articles critically explored family relationships among older Chinese immigrants (Pei-Chia, 2002; Wong *et al.*, 2006; Lo and Russell, 2007; Dong *et al.*, 2012b; Lin *et al.*, 2017). The most frequently cited reasons for the migration of older Chinese people include family and domestic responsibilities, such as taking care of grandchildren and assisting in household work (Da and Garcia, 2015). These findings show that family relations do not always meet the needs of filial expectations of immigrant parents. Older Chinese immigrants frequently feel they are peripheral to the family and no longer have any authority because of their lack of language proficiency and knowledge of Western culture. This often leads to feelings of uselessness in family decision-making (Wong *et al.*, 2006; Ip *et al.*, 2007). As a result, older Chinese immigrants are more likely to want to live independently, since they are reluctant to live in someone else's home (Wong *et al.*, 2007; Da and Garcia, 2015). This lack of satisfying intergenerational relationships is the main factor influencing the wellbeing of older immigrants (Dong *et al.*, 2012b; Luo and Menec, 2018).

Relationships of friends constitute a minor component of the social networks of many older Chinese immigrants (Dong and Chang, 2017). Friends usually offer general information or advice (learning English, applying for citizenship or using health services) and some level of companionship (Wong *et al.*, 2005; Tieu and Konnert, 2014). Apart from social networks, community engagement, as an important domain in the neighbourhood social environment, also influences the health and wellbeing of older Chinese immigrants. Tan *et al.* (2010) found that in Chinese cultural norms, participation in social activities and community work is regarded as 'ageing' successfully. However, a previous study found that the rate of civic and social participation by older Chinese immigrants was low, and higher participation in inappropriate civic activities may even result in stress and anxiety (Luo and Menec, 2018). This demonstrates the need to understand the social environments of older Chinese immigrants specifically because these environments contribute to their health and wellbeing (Tan *et al.*, 2010; Van Cauwenberg *et al.*, 2014; Tiraphat *et al.*, 2017; Luo and Menec, 2018).

The relationship between the physical environment and health and wellbeing

Apart from the dramatic shifts in the social environment, physical environment also dramatically changes after migrating to a foreign country. Although the impact of the built environment on the wellbeing of older people has been well documented (Van Cauwenberg *et al.*, 2011; Timmermans *et al.*, 2016; Soma *et al.*, 2017), there is a relatively small body of literature that casts a geographic lens on the relationship between older Chinese immigrants' health and wellbeing, and the effects of their built environments (green space, street, facilities, and safety and accessibility, for instance). Living in a strange built environment can be extremely distressing.

Only two studies by Da and Garcia (2015) and Selvarajah (2004) were found which suggested good traffic management could improve the quality of life of older Chinese immigrants. In addition, research on the physical environment for other ethnic minority groups was also scarce. Sawchuk *et al.* (2011) investigated physical environment barriers and facilitators of walking and physical activity among older Indian immigrants, and found that better accessibility to interesting places, shopping places and parks would encourage more physical activity. Physical activities are important in understanding how the built environment influences the health and wellbeing of older Chinese immigrants, which is a crucial research topic in gerontology geography (Van Cauwenberg *et al.*, 2011; Barnett *et al.*, 2017; Tuckett *et al.*, 2018). More research is needed to understand this area.

In relation to the natural environment, there are relatively few studies on the impact the natural environment has on the wellbeing of older immigrants. Some studies mentioned that fresh air, a healthy environment and clean water are factors that influence the wellbeing of older immigrants (Da and Garcia, 2015; Ip *et al.*, 2007). However, no literature was found which critically investigated how the change in the natural environment influenced the wellbeing of older immigrants.

The relationship between place attachment and health and wellbeing

Place attachment for older Chinese immigrants was a recurring topic in the literature reviewed. Migrating to another country requires a redefinition of what place means, and transnational migration exposes the fluid and dynamic nature of the place and its meanings, which does not mean abandoning attachment to the place of origin but building a sense of place within the destination. Older Chinese immigrants were a special group who left their home country and settled in foreign countries in their later lives. The experience of trading-off between two lives in two countries influences the wellbeing of older Chinese immigrants (Li *et al.*, 2014). In addition, Zhan *et al.* (2017) provided insight into the factors that may influence the sense of home among elderly Chinese Americans, and suggested that English proficiency, favourable family relationships and social policies will influence the sense of home as well as health and wellbeing. However, studies seemed to need further research to study the physical aspects of place attachment and its relationship with health and wellbeing for older Chinese immigrants.

Discussion and conclusion

The last few decades have seen an increase in research to show that older Chinese immigrants are facing various challenges in their neighbourhood environment. Using research from 2000, this review attempts to show not only health and wellbeing issues, but also the relationship between the neighbourhood environment and the health and wellbeing of older Chinese immigrants. The dramatic increase in older Chinese immigrants worldwide and the vulnerability of this group indicate the importance of research on different topics regarding this group of people. Social environments surrounding older Chinese immigrants have been critically researched in existing literature. However, less is known about how the physical environmental and geographical mechanisms link older Chinese immigrants to their health and wellbeing.

This review focused on the associations between neighbourhood environment, as a concept which synthesises both physical and social aspects, and health and wellbeing. It is important to focus on the impact of not only neighbourhood social environments but also the physical environment. In current literature, impacts of social environment on older Chinese immigrants have been investigated critically in the areas of social science. However, few studies concentrated on physical environment and environmental development regarding older Chinese immigrants from the perspective of geography. Therefore, future research opportunities lie in exploring how older Chinese immigrants interact with their neighbourhood environment. In future studies, a perspective from urban planning and design could help to understand how to build a better physical environment for residents with various cultural backgrounds. Important elements of the physical environment, such as urban design, crime prevention, provision of roads and pathways for daily travel, land use, and distances between amenities and facilities (Davison and Lawson, 2006) could also be investigated critically. In order to meet the challenges of building the environment for all segments of population, planners and policy makers are encouraged to understand the interaction between the environment and different groups of people to provide appropriate measures to create supportive and effective environments.

Apart from the general impacts of the physical environment on older people, the distinctive characteristics of Chinese immigrants (such as their culture, traditions and social ideology) need to be identified as this influences their perception of their physical environment. Chinese culture influences values held by this group, which then impacts their behaviour. For example, harmonious human and earth relations or conformity with nature in Chinese culture stresses the importance of the natural environment on health (Chen, 1996). Chinese traditions and social ideology can influence daily activities such as entertainment activities (Ip *et al.*, 2007), shopping for traditional Chinese groceries (Wang and Lo, 2007) and health-care seeking, as well as taking traditional Chinese medicine (Lai and Chappell, 2006).

In terms of the social environment, family is the most significant factor influencing the health and wellbeing of older Chinese immigrants in Eastern culture (Lo and Russell, 2007; Dong *et al.*, 2012b). This review demonstrates that older Chinese immigrants are meeting various challenges in their neighbourhood environment, such as social exclusion and lower participation in social activity. Existing reviewed studies found that although the family is still the main provider of care, this type of support is in decline (Wong *et al.*, 2006; Dong *et al.*, 2012b). Changes to 'traditional' family care and the familial relationship coupled with the loss of social networks and support after migration impact immigrant's health and wellbeing (Ip *et al.*, 2007; Wu *et al.*, 2011). This suggests that other social support providers, such as social organisations, neighbourhood centres and health-care professionals, have a role to play in promoting the health and wellbeing of older Chinese immigrants.

In future research, other types of health and wellbeing policies for older immigrants should be taken into consideration as well. The wellbeing of older Chinese immigrants and their use of health care has been critically investigated by a large body of literature, but few studies provide practical policies to improve the *status*

quo. Most research found that language barriers were the main factor influencing access to health care, but empirical research revealed that simply providing a linguistically appropriate health service had no significant impact on the use of these services by older Chinese immigrants (Lai and Chau, 2007b). Therefore, further research on how to improve access to and use of health-care services is needed. Apart from improving the health service itself, other useful management tools could be considered such as health education and health policy workshops to help older immigrants get a better understanding of how to use health care.

Additionally, Australia is the third largest Western country that hosts Chinese immigrants worldwide (Figure 1). One in three older people were born overseas and the majority of these were originally from non-English-speaking countries. The number of international immigrants has been increasing rapidly in recent years (Australian Institute of Health and Welfare, 2018). However, the number of studies on older Chinese immigrants in Australia is limited. Poorer socio-economic status, language barriers and the lack of knowledge on the use of services among these older immigrants will pose more burden on the housing market, health care and other social welfare services. However, the review showed that the number of articles is small and the research topic into this group of people is relatively narrow. Therefore, more research in various topics regarding older Chinese immigrants is needed in Australia.

The primary strength of this review is its focus on older Chinese immigrants, an under-studied population in urban geography and an important group for future health-care systems. In this review, due to the multi-disciplinary nature of this topic, a comprehensive search in multiple databases was undertaken. This review explored peer-reviewed literature that investigated the health and wellbeing of older Chinese immigrants. An analysis based on the neighbourhood environment was undertaken. The results suggest that older Chinese immigrants are less resilient and face various challenges within both the social and physical environments that comprise a neighbourhood. This finding emphasises the significant need for future research and, in particular, research exploring reasons for these challenges. This research potentially has profound implications for urban planning and wellbeing policies. In particular, existing literature has neglected to address the effects of the neighbourhood physical environment on health and wellbeing. There is a need for further research on the relations between physical environment and health and wellbeing to understand better the impact this will have on the health and wellbeing of these older Chinese immigrants. This knowledge provides a unique opportunity for policy reforms in regard to social welfare, multiculturalism, social engagement, as well as neighbourhood redesign and development.

Conflict of interest. The authors declare no conflicts of interest.

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