Determinants of subjective well-being among migrant and local elderly in China: a cross-sectional study

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ABSTRACT

Objectives The study aimed to examine the association between individual and community levels in relation to subjective well-being (SWB) among the migrant and local elderly. It particularly focuses on the extent to which and the ways in which the residential environment of migrant and local elderly influences their SWB.

Design A cross-sectional study.

Setting Our study was conducted in Dongguan City, China.

Participants Two groups of elderly (aged ≥60 years), including migrants and local residents, were recruited. A total of 470 migrants and 422 local residents participated in this study.

Main outcome measures SWB was assessed by the Memorial University of Newfoundland Scale of Happiness.

Results The community-level health facility density had a positive association with SWB (B=0.38, p<0.01), whereas the financial facility density had a negative association (B=−0.42, p<0.01). The density of health and financial facilities affected the local elderly more than the migrant elderly. Social cohesion is an aspect of the social environment of the community that influenced elders' SWB (B=0.72, p<0.001).

Conclusions The primary determinants of SWB for both the migrant and local elderly included individual, societal and environmental factors.

INTRODUCTION

Subjective well-being (SWB), defined by Diener, refers to how people perceive the quality of their life, events in their life and the circumstances in which they live. As a rapidly ageing population becomes an increasingly serious social challenge in large Chinese cities, such as Beijing and Shanghai, issues affecting the elderly's SWB have attracted greater concern. The relationship between the environment and humanity is one of interdependence. Therefore, just as our actions and choices affect the environment, the environment influences our health and well-being. In particular, for the elderly, their community of residence is their predominant environmental context. The physical and social environment may be more important to those who are retired and therefore are likely to spend more time in the community. Based on research in China, Liu et al indicated that residential environment exerts a stronger effect on elders’ SWB than individual resources.

In recent decades, one of the fastest-growing fields of SWB study has been understanding the impact of one’s residential environment on one’s SWB. As such, researchers have paid increasing attention to the effects of environmental stressors and residential facilities on well-being. The literature has confirmed that neighbourhood-built environments affect residents’ SWB. The research on Metropolitan Baltimore by Vemuri et al indicated that a clean and uncontaminated neighbourhood-built environment had a significantly positive impact on residents’ SWB. A study by Nordbakke and Schwanen demonstrated that residents’ accessibility to shops and public transportation was positively associated with their SWB. However, residential environment characteristics can also decrease residents’ SWB. A study by Cao et al indicated that high population density and poor street connectivity of neighbourhoods were detrimental to residents’ SWB. Moreover, some
literature has examined the association between social environmental (eg, social support and cohesion) and residents’ SWB.10–12 Social cohesion, or good relationships among members within a community,13 as a neighbourhood determinant of mental health is particularly relevant to elders because of its association with neighbourhood social order.14 Studies have demonstrated that social cohesion is associated with SWB and depressive symptoms.10–12

Over the past three decades, China has undergone rapid economic growth. Despite this, China is facing increasing social inequality. Due to hukou (a household registered system) barriers, rural migrants are not entitled to all social benefits and services enjoyed by local residents in cities.7 Empirical studies on residential environments have demonstrated that migrants are scattered in the peripheral communities, mostly distributed over the urban villages or factory dormitories, resulting in relatively poor access to physical environment resources.2 15 In contrast, locals primarily dominate the traditional and commercial housing in the city centre and have good access to physical environment resources. The hukou system plays a role in migrant inequality and thus may affect the well-being of the migrant elderly more than the local elderly. The existing literature on migrants’ SWB has suggested that migrants have a lower level of well-being after migration than ever before.15 16 Migrants generally have a lower level of well-being than locals due to their difficulty in adapting to their new city. The implication of local-migrant residential environmental inequity on their SWB has scarcely been studied. Environmental inequity might imply unequal access to basic facilities, services and social resources, in addition to pressure when interacting with neighbours, which might cause a difference in well-being for migrants and locals.

SWB can be influenced by various factors. Studies have demonstrated that individual factors (eg, physical and mental health and socioeconomic status) and contextual factors (eg, residential environment) are associated with the SWB of the elderly.17 However, existing studies have only focused on one determinant, and little effort has been made to integrate these multidisciplinary and multi-level factors of SWB.

To fill in these knowledge gaps, this paper assesses the factors that influence migrant and local elderly’s SWB through a multilevel perspective. The study aimed to examine the association between individual-level and community-level factors in relation to SWB among the migrant and local elderly. It particularly focuses on the extent to which and the ways in which the residential environment of the migrant and local elderly influences their SWB. Having detailed knowledge on how the residential environment affects the SWB of migrants and local elderly is crucial for assessing the sustainable development plan for the ageing community with cultural diversity. The results of this study will also provide useful information to help policymakers devise appropriate strategies to improve the SWB of both the local and migrant elderly in China by rearranging their living environment.

MATERIALS AND METHODS
Study design and setting
A community-based study employing a questionnaire survey was conducted in Dongguan, China, from December 2018 to December 2019. Dongguan is an economic benchmark city with the third highest gross domestic product in the Pearl River Delta Region of Guangdong Province, which is located in the south of China. The municipal government has grouped the city into 33 township-level communities, which includes 248 residential communities. Dongguan has one of the largest migrant populations in China. In 2016, approximately 75% (6.25 million) of its total population consisted of migrants from various sociodemographic and cultural backgrounds.18

Study sample
Eligibility criteria for participants
Two groups of elderly—migrants and local residents—were recruited. The elderly in this study were defined as any person aged 60 years or older. Migrants were defined as those who had moved to Dongguan, had been living there for at least 6 months prior to the study (December 2018) and were not listed in the household registration system of Dongguan, whereas local residents were defined as those whose households were currently registered in the study area. The community committee provided a list of migrants and local elderly eligible for the study.

Sample size
The required sample size was calculated to estimate the difference in SWB for the migrant and local elderly. The estimated difference in SWB of migrant elderly and local elderly was 7.8 and 8.0, respectively.19 20 With a design effect of 1.1 and a non-response rate of 5%, the required sample size was at least 880. To account for possible missing data, 5% more participants were recruited. The final sample size was 920 participants, including 460 migrant and 460 local elders.

Sampling method
A multistage cluster sampling survey technique was used to select participants. In the first stage, 4 out of 33 districts were purposely selected (Dalang, Liaobu, Dalingshan and Songshan Lake) due to each population having >75% elderly and each district being located within 30 km of Guangdong Medical University. In the second stage, 22 clusters, which included 20 local and 20 migrant elders in each cluster, were randomly selected from 26 communities with a probability proportional to the elderly population density. Eventually, 15 communities were selected. In the third stage, within each cluster, migrant and local elderly participants were selected randomly.
Patient and public involvement
No patients were involved.

Measurements
Measuring SWB
SWB was assessed by the Memorial University of Newfoundland Scale of Happiness (MUNSH). The tools were specifically designed for measuring the SWB of the elderly. The validity was 0.703 by Kaiser-Meyer-Olkin test and the consistency was 0.735 by Cronbach’s alpha. The validity of MUNSH for urban and rural elderly in China was 0.43 and 0.62, respectively, which reached a high level of significance. Total scores ranged between ~24 and +24 points, with higher scores indicating better SWB.

Individual-level measurements
Individual characteristics
Individual characteristics, including sociodemographic information, health status, health-related behaviours and social support, were collected using face-to-face interview questionnaires. The sociodemographic factors collected were gender, age, healthcare insurance and pension status. Health insurance and pension status were divided into ‘have’ and ‘do not have’ groups. Information on health status, namely self-rated health, chronic diseases and depressive symptoms, was also collected. Depressive symptoms were measured using the Zung Self-Rating Depression Scale (SDS), which is recommended by WHO for the screening of depression. The SDS scores range from 20 to 80. A score >50 indicates possible clinical depression.

Regular exercise was defined as exercise >3 times/week. The Multidimensional Scale of Perceived Social Support was used to assess perceptions of social support. It contains 12 questions (each question score ranges from 1 to 7) with a total score ranging from 12 to 84, which is categorised into low (<37), moderate (37–60) or high (>61).

Residential environmental measurements
The residential environment included the walkability and social cohesion. Walkability of the neighbourhoods was measured using a scale developed by Mujahid. The questionnaire included questions about the opportunities and facilities for physical activities, adequate green space and walkable places. This scale uses a 5-point Likert scale, ranging from strongly disagree to strongly agree with the statements. The Cronbach’s alpha of the original scale was 0.73. The total score ranges from 7 to 35. Social cohesion, which describes the quality of relationships among members within the community, was assessed by the Neighbourhood Relation Scale. The questions included interpersonal trust and the relationship between neighbours. This scale also uses a 5-point Likert scale, with responses ranging from strongly disagree to strongly agree with each statement. The Cronbach’s alpha of the original scale was 0.74. The total score ranges from 7 to 20.

Community-level determinants
The number of financial and health facilities in each community was collected. The square kilometres in each community was also collected. The density of financial/health facilities was the number of financial/health facilities divided by square kilometres in each community.

Data collection
Face-to-face interviews using the aforementioned structured questionnaire were conducted. All of the participants were interviewed at their home in their local language by trained interviewers. Each interview took approximately 20–25 min. Community information was also collected from the administrative committees of the community in which the participants lived.

Statistical analysis
All analyses were conducted using R V.3.4.2 and QGIS V.3.12.2. Community-level variables, the distribution of financial and health facilities and SWB were explored using choropleth maps.

Multilevel models were used to assess the determinants of SWB at both the individual and community levels, and to determine the differences between migrant and local elderly. Linear mix models were used to assess the effects of individual-level and community-level factors on the SWB of the elderly. Elderly (level 1) were considered to be nested within 15 community clusters (level 2). A null model (no covariates) was used to obtain an estimate of the residual and intercept variance when only the clustering by community was considered.

After testing the community-level variance in SWB without the inclusion of any explanatory variables, this research examined the relationship between individual-level and community-level attributes of communities with SWB (models 1 and 2, respectively). Thereafter, all individual-level and community-level variables were simultaneously assessed in model 3. Finally, the interactive effects between migrant status and the community-level factors were added and examined in model 4. The present study used the −2 log likelihood and Akaike information criterion (AIC) for model selection. All p values were two-tailed, and statistical significance was set at <0.05.

RESULTS
A total of 470 migrants (245 women, 225 men; M_age=67.5 years, SD=5.5) and 422 local residents (230 women, 192 men; M_age=69.2 years, SD=6.1) participated in this study (97.2% response rate). The median density of financial facilities was 4.95 facilities/km² (range: 0.88–19.02). The median density of health facilities was 5.03 facilities/km² (range: 0.65–12.23). There was inequality in the distribution of financial and health facilities among these 15 communities. Songshan Lake District had the lowest density of financial and health facilities due to 70% of the district being a lake. There was also an unequal distribution of SWB among communities. The communities from...
Liaobu District had a higher SWB score than those in the other three districts. Most communities had a moderate to high level of SWB (the median score ranged from 12.0 to 19.0). Despite the residents of Songshan Lake District having the lowest density of financial and health facilities, they had a high level of SWB (table 1).

The geographical distributions of financial and health facility densities and the SWB among 15 communities are presented in figure 1. Health facility density was weakly positively correlated with SWB, with a Spearman’s rank correlation coefficient of 0.17. The financial facility density was negatively correlated with SWB, with a Spearman’s rank correlation coefficient of –0.58 (figure 2).

The null model (model with only random intercept) indicated that there was a statistically significant variation in SWB across communities ($\chi^2=160.75, p<0.05$). The intraclass correlation coefficient was 0.206, indicating that 20.6% of variance in SWB was explained by a random effect across communities.

The results from the multilevel analysis of elderly’s SWB and the determining factors are shown in table 2. In model 1, all individual-level variables were included. Migrant elderly were 2.68 points higher in SWB than local elderly ($B=2.68, p<0.001$). Depression had the strongest association with SWB after adjustment for other covariates. Individuals who were not depressed were 8.85 points more likely to have a high level of SWB.

### Table 1 Summary of characteristics of 15 communities and level of SWB in each community

| District     | Community       | Local elderly participated (n) | Migrant elderly participated (n) | Population density (n/km²) | Financial facility density (n/km²) | Health facility density (n/km²) | SWB level (median score) |
|--------------|-----------------|--------------------------------|----------------------------------|---------------------------|-----------------------------------|---------------------------|--------------------------|
| Dalang       | Dajing Tou      | 20                             | 20                               | 8365                      | 7.32                              | 8.15                      | 13.0                     |
|              | FoZiao          | 19                             | 20                               | 6415                      | 3.35                              | 3.67                      | 14.0                     |
|              | Qiufu Lu        | 21                             | 24                               | 9660                      | 11.76                             | 7.65                      | 12.0                     |
|              | Changtang       | 20                             | 21                               | 7738                      | 13.51                             | 3.25                      | 12.5                     |
|              | Huangcao Lang   | 20                             | 21                               | 4536                      | 1.43                              | 3.57                      | 16.0                     |
| Liaobu       | Liaobu          | 23                             | 26                               | 11 900                    | 19.02                             | 12.23                     | 14.0                     |
|              | Tangbian        | 20                             | 22                               | 8990                      | 1.5                               | 7.58                      | 18.0                     |
|              | Fushan          | 58                             | 60                               | 11 468                    | 3.12                              | 6.56                      | 18.0                     |
|              | Quantang        | 19                             | 23                               | 9346                      | 5.23                              | 10.47                     | 19.0                     |
|              | Niuyang         | 21                             | 26                               | 14 490                    | 4.95                              | 3.88                      | 16.0                     |
|              | Hengkeng        | 37                             | 42                               | 8395                      | 6.55                              | 8.78                      | 18.0                     |
| Daling Shan  | Xintang         | 20                             | 23                               | 6896                      | 2.22                              | 1.67                      | 15.5                     |
|              | Daling Shan     | 52                             | 57                               | 8616                      | 2.48                              | 1.52                      | 16.0                     |
|              | Nongchang       | 22                             | 25                               | 5876                      | 6.12                              | 5.03                      | 16.5                     |
| Songshan Lake| Songshan Lake   | 51                             | 60                               | 675                       | 0.85                              | 0.65                      | 17.0                     |

![Figure 1](image1.png)  
**Figure 1** The geographical distribution of subjective well-being and facilities among 15 communities.

![Figure 2](image2.png)  
**Figure 2** The correlation of subjective well-being and facilities.
Table 2  Results from linear mixed model assessing individual-level and community-level factors of elderly's subjective well-being in Dongguan

|                                | Model 1     | Model 2     | Model 3     | Model 4     |
|--------------------------------|-------------|-------------|-------------|-------------|
| **Fixed part**                 |             |             |             |             |
| **Individual variables**       |             |             |             |             |
| Migrant status (ref.=local)    | 2.68***     | 2.68***     | 2.03***     | 0.74        |
| Migrant                        |             |             |             |             |
| Female                         | 0.76        | 0.72        | 0.81        | 0.29        |
| Gender (ref.=male)             |             |             |             |             |
| Female                         | 0.76        | 0.72        | 0.81        | 0.29        |
| Age (ref.=60–69 years)         |             |             |             |             |
| 70–79 years                     | 0.88        | 0.59        | 0.56        | 0.58        |
| 80–99 years                     | 1.30*       | 0.93*       | 0.76*       | 0.36        |
| Has healthcare insurance (ref.=no) |             |             |             |             |
| Yes                             | 0.80        | 0.92        | 0.91        | 0.60        |
| Has pension (ref.=no)          |             |             |             |             |
| Yes                             | 1.10*       | 1.07*       | 1.08*       | 0.61        |
| Self-rated health (ref.=poor)  |             |             |             |             |
| Good/Fair                       | 2.88***     | 2.71***     | 2.76***     | 0.75        |
| Has chronic disease (ref.=yes) |             |             |             |             |
| No                              | 1.66***     | 1.65***     | 1.68***     | 0.48        |
| Depression (ref.=yes)          |             |             |             |             |
| No                              | 8.88***     | 8.88***     | 8.86***     | 0.61        |
| Regular exercise (ref.=no)     |             |             |             |             |
| Yes                             | 2.30***     | 2.18***     | 2.18***     | 0.60        |
| Adequacy of social support (ref.=low) |       |             |             |             |
| Moderate                        | 4.72***     | 4.99***     | 5.00***     | 1.07        |
| High                            | 0.37***     | 6.12***     | 6.13***     | 1.06        |
| Walking environment (ref. <28) |             |             |             |             |
| ≥28                             | 0.10*       | 0.08        | 0.08        | 0.06        |
| Social cohesion (ref. <16)     |             |             |             |             |
| ≥16                             | 0.70***     | 0.72***     | 0.72***     | 0.11        |
| **Community variables**         |             |             |             |             |
| Density of health facility     | 0.38*       | 0.21*       | 0.32*       | 0.10        |
| Density of financial facility  | −0.42**     | −0.34**     | −0.49**     | 0.11        |

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Higher in SWB than those who were depressed. Good social support, lack of chronic diseases, older age, being on a pension, good self-rated health and regular exercise were significantly related to higher SWB. The environmental factors, including walkable environment and social cohesion, were also positively associated with SWB.

In model 2, only community-level variables such as health facility density and financial facility density were included. Health facility density had a positive association with SWB (B=0.38, p<0.01), whereas financial facility density had a negative association (B=−0.42, p<0.01).

In model 3, individual-level and community-level variables were simultaneously included in the model. After other covariates were controlled, except for walkable environment (B=0.77, p>0.05), age, pension status, self-rated health, regular exercise, chronic diseases, depression, adequacy of social support, social cohesion and density of health and financial facilities remained significantly associated with SWB.

In model 4, the interaction term between the community-level variables and migrant status was added to model 3. Compared with the other three models, model 4 had a much smaller AIC value, which implied that this model could explain the variation in SWB better than other models. Migrant elderly were 2.03 points higher in SWB than local elderly. The coefficient of the interaction term and migrant status showed that the effect of health and financial facility density on local and migrant elderly was different. For every one-unit increase in the density of health facilities, the SWB of local elderly increased by 0.32 points. Among migrant elderly, for every one-unit increase in the density of health facilities, the SWB increased by only 0.02 points. For every one-unit increase in the density of financial facilities, the SWB of local elderly decreased by 0.49 points. Among migrant elderly, for every one-unit increase in the density of financial facilities, the SWB decreased by 0.05 points. In other words, community-level factors affected the SWB of the local elderly more than the migrant elderly after other covariates were controlled (table 2).

DISCUSSION

The primary determinants of SWB for both migrant and local elderly included individual, societal and environmental factors. This paper has made a major theoretical contribution to the existing literature by exploring and extending the geographical dimension of well-being and social environmental factors for the SWB of the elderly. In addition, this paper has provided a more comprehensive understanding of the effects of residential environment on elderly SWB by taking account the crucial individual factors.

This research discovered that community-level health facility density was positively associated with good SWB. The primary determinants of SWB for both migrant and local elderly included individual, societal and environmental factors. This paper has made a major theoretical contribution to the existing literature by exploring and extending the geographical dimension of well-being and social environmental factors for the SWB of the elderly. In addition, this paper has provided a more comprehensive understanding of the effects of residential environment on elderly SWB by taking account the crucial individual factors.

Table 2 Continued

|                          | Model 1 |         | Model 2 |         | Model 3 |         | Model 4 |         |
|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|                          | Coefficient | SE     | Coefficient | SE     | Coefficient | SE     | Coefficient | SE     |
| Density of health facility×migrant status | −0.30* | 0.14    | 0.44* | 0.15    | 0.44* | 0.15    | 0.44* | 0.15    |
| Density of financial facility×migrant status | 0.18    | 0.13    | 0.29    | 0.15    | 0.20    | 0.12    | 0.19    | 0.12    |
| Random effect            |         |         |         |         |         |         |         |         |
| Community-level variance | 0.18    | 0.13    | 0.29    | 0.15    | 0.20    | 0.12    | 0.19    | 0.12    |
| Model fit                |         |         |         |         |         |         |         |         |
| −2LL                     | 5971    | 6442    | 5957    | 5954    | 5957    | 5954    | 5980    |         |
| AIC                      | 5998    | 6479    | 5989    | 5980    | 5989    | 5980    | 5980    |         |

Intraclass correlation coefficient=0.26.
*P<0.05; **p<0.01; ***p<0.001.
Model 1: including all individual-level variables; model 2: including only community-level variables; model 3: including individual-level and community-level variables; model 4: including cross-level interactions.
AIC, Akaike information criterion; LL, log likelihood.

Table 2 Continued

|                          | Model 1 |         | Model 2 |         | Model 3 |         | Model 4 |         |
|--------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|                          | Coefficient | SE     | Coefficient | SE     | Coefficient | SE     | Coefficient | SE     |
| Density of health facility×migrant status | −0.30* | 0.14    | 0.44* | 0.15    | 0.44* | 0.15    | 0.44* | 0.15    |
| Density of financial facility×migrant status | 0.18    | 0.13    | 0.29    | 0.15    | 0.20    | 0.12    | 0.19    | 0.12    |
| Random effect            |         |         |         |         |         |         |         |         |
| Community-level variance | 0.18    | 0.13    | 0.29    | 0.15    | 0.20    | 0.12    | 0.19    | 0.12    |
| Model fit                |         |         |         |         |         |         |         |         |
| −2LL                     | 5971    | 6442    | 5957    | 5954    | 5957    | 5954    | 5980    |         |
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AIC, Akaike information criterion; LL, log likelihood.
on SWB. This implies the significance of healthcare resources to the elderly and its effect on SWB. Access to healthcare services is critical to good health and well-being, which is consistent with existing literature. The negative influence of financial facility density on SWB of the elderly might be explained by the indirect effects from other environmental factors, such as noise and overcrowding in areas with high financial facility density. However, a study in New Zealand showed that residents' accessibility to shops and public transportation was positively associated with their SWB. Social cohesion is an aspect of the social environment of the community that influences individual well-being. This may imply that the elderly prefer to live in a more vibrant social environment in which neighbours provide help and support in promoting access to services. Helliwell and Putnam found that interactions with neighbours and friends have a positive impact on individuals' SWB.

The density of health and financial facilities affected the local elderly more than the migrant elderly. This may be due to the fact that the hukou system has recognised local and migrant status, regulating privileges and social welfare and resource access. Elderly migrants often could not enjoy the government healthcare insurance in their new city. In existing qualitative research, most elderly migrants reported difficulties in obtaining healthcare reimbursements, as the reimbursement process was extremely troublesome for them, despite being simple for locals. Therefore, healthcare facilities might not be important for migrants since they do not have free access to such facilities. However, all locals enjoy healthcare insurance and free access to healthcare services. The density of healthcare facilities was more important for the locals as they are more likely to use healthcare services. This health inequality between locals and migrants potentially leads to inequality in well-being. Most of the elderly migrants lived in the centre of the city, which had a comparatively better physical environment (eg, convenient facilities and transportation) than their place of origin, thus giving them good SWB, which is consistent with the results of a previous study. A study by Liu et al found that neighbourhood amenities and public transportation are associated with migrants' SWB. In contrast, locals did not like living in commercial residential environments due to the noise and overcrowding in the areas with high financial facility density. Thus, financial facility density had a more negative impact on locals' SWB than migrants' SWB.

There are some limitations to this study that require attention. First, as this research selected districts and communities with a high density of migration, the sampling may have caused selection bias, which could be a possible explanation for the high levels of SWB of elderly migrants. Second, the information obtained from all participants was self-reported; memory recall may therefore be an issue. Third, in the multilevel analysis, individual averages used as group effects were usually interpreted as contextual effects, but these effects could not necessarily be interpreted causally. Finally, temporal ambiguity concerning causes and effects may be present.

From the aforementioned results, it is worth suggesting the following policy implications. First, the significant role of the residential environment in SWB offers urban planners and local governments insight for shaping elderly friendly environments. Such environments should include easy access to health facilities and a convenient pedestrian and public transport system. Second, policies related to social services should address the needs of the migrant elderly. Enhancement of migrant elderly social welfare (eg, pensions) and promotion of access to healthcare are needed through planning service delivery for the whole community. Third, community events are indispensable to promote the interaction and mutual activities between elderly and should thus be increased. Finally, increasing the number of healthcare facilities for the elderly can improve their SWB.

CONCLUSION

Overall, the primary determinants of SWB for both the migrant and local elderly included individual, societal and environmental factors. One way to achieve sustainable development of China is through city planning for the equal distribution of financial and healthcare facilities.

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