Perceived Community Age-friendliness is Associated With Quality of Life Among Older Adults

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Abstract
We examined the positive association between perceived community age-friendliness and self-reported quality of life for older adults. A total of 171 participants, aged 77–96 years, completed a mail-in questionnaire package that included measures of health (SF-36 Physical), social participation (Social Participation Scale), community age-friendliness (Age-Friendly Survey [AFS]), and quality of life (WHO Quality of Life). Hierarchical regression models including age, gender, driving status, finances, health, social participation, and AFS scores explained 8 to 21 per cent of the variance in quality of life scores. Community age-friendliness was a statistically significant variable in all models, accounting for three to six and a half per cent of additional variance in quality of life scores. Although the proportion of variance explained by age-friendliness was small, our findings suggest that it is worthwhile to further investigate whether focused, age-friendly policies, interventions, and communities could play a role towards successful and healthy aging.

Keywords
community, aging, participation, well-being

The concept of age-friendliness has gained momentum due to aging populations worldwide, the implementation of policies to support aging in place, and the World Health Organization’s (WHO) emphasis on developing age-friendly cities to promote active aging (Lui et al. 2009; Plouffe & Kalache, 2010; Plouffe & Kalache, 2011; World Health Organization, 2007). Age-friendly environments are those that promote healthy aging by “building and maintaining intrinsic capacity across the life-course and enabling greater functional ability in someone with a given level of capacity” (World Health Organization, 2015, pp. 225). Such communities have policies, systems, services, and technologies to promote and maintain physical and mental health. They enable individuals to be involved in the activities they choose, irrespective of changes in their capacity (WHO, 2015). In Canada, the concept of age-friendly communities has been promoted by the federal government and adopted by many municipalities across the country (Public Health Agency of Canada, 2010).

There is a growing body of scholarship investigating the aspects of a community that contribute to age-friendliness and how to develop an age-friendly community (Buffel et al. 2014; Smith et al. 2013; Yan et al., 2014). Based on the concept of active aging, the WHO identified dimensions of age-friendly communities that support healthy aging: housing, transportation, outdoor spaces and buildings, community support and health services, social participation, respect and social inclusion, communication and information, and civic participation and employment (WHO, 2007). Subsequent research categorized the age-friendly domains as belonging to either physical, social, or service environments (John & Gunter, 2016).

Research on age-friendliness has been approached from an ecologic perspective (e.g., Scharlach & Lehning, 2013).
Ecologic theory posits an interaction between individuals and their environments; it highlights the view that quality of life will be highest for those individuals experiencing the greatest fit between their personal characteristics and needs, and their physical and social environment (Menec et al., 2011). Taking this perspective, Choi et al. (2020) examined the relationship between the social environment and perceived age-friendliness in a sample of 264 participants age 50 years and above. Age-friendliness was captured using two items, each on a five-point scale; participants were asked to rate their city and neighborhood as a good place to live as they aged. Their findings showed that access to community events, volunteer resources, and community events were associated with subjective ratings of age-friendliness. In addition, the authors showed that connection to community mediated the relationship between access to events and perceived age-friendliness. Most recently, Tang et al. (2021) examined the relationships between the built environment, sense of community, and health outcomes in a large sample (n = 2247) of community-dwelling middle-aged and older adults living in Hong Kong. The authors found that sense of community mediated the relationships between the environment and physical and mental health outcomes. Taken together, these studies highlight the relevance of the social environment to older adults’ perceptions of age-friendliness and to health outcomes.

Theoretical underpinnings of quality of life research suggest that people create their own well-being using the resources available within their neighborhood and that neighborhood features can positively or negatively impact quality of life (Nieboer & Cramm, 2018). Community features may act as a resource for older adults to maintain quality of life as they adjust to losses, such as changes in health. Theoretical approaches to studying both quality of life and age-friendliness emphasize the role of the environment and align with other frameworks that allow us to study the multiple dimensions of aging. For example, in their comprehensive framework of mobility in older adults, Webber et al. (2010) emphasized the importance of maintaining community mobility in older adulthood, and that community features can act as important determinants of health and quality of life outcomes. However, researchers have noted that empirical evidence specifically supporting the relationship between age-friendly communities and quality of life is sparse (Menec et al., 2011).

Of the limited research available, some researchers investigating age-friendliness have found that different aspects are associated with various quality of life measures in samples of older adults (Friedman et al. 2012; Lehning et al. 2014; Menec et al. 2015; Nieboer & Cramm, 2018; Park & Lee, 2017). For example, Lehning et al. (2014) found that access to health care, social support, and community engagement were positively associated with self-rated health, while neighborhood problems were negatively associated with self-rated health. Friedman et al. (2012) found that neighborhood safety and social cohesion, but not neighborhood walkability, were associated with quality of life for older adults in New York City. Using a composite measure of age-friendliness (perceived safety, access to services, and walkability) with residents from four cities in Ireland, Gibney et al. (2019) found that people living in more age-friendly cities were more likely to report higher quality of life and well-being. However, this research has investigated only one or a few dimensions of age-friendliness, rather than encompassing all domains.

To fully investigate the impact of community age-friendliness on quality of life, it was necessary to develop a tool to measure all of the domains of age-friendliness. Menec and Nowicki (2014) created the Age-Friendly Survey (AFS), a full-scale measure of self-reported age-friendliness of one’s neighborhood. The measure incorporates the WHO framework (Menec & Nowicki, 2014), and congruence has subsequently been demonstrated between subjective AFS scores of age-friendliness completed by community residents and objective measures completed by municipal officials (Menec et al., 2016). Investigating age-friendliness and satisfaction with life, Menec and Nowicki (2014) found that perceived age-friendliness was associated with self-rated health and life satisfaction in a sample of older adults from rural Manitoba. However, these outcome measures were based on single items each capturing health and life satisfaction rather than utilizing composite measures to more fully capture health and life satisfaction.

Existing evidence has focused on one element of age-friendliness (e.g., physical, social, or service environments) or has relied on single items to quantify outcomes. Moreover, existing research in this field tends to include few covariates known to influence quality of life and health outcomes. The purpose of the present study was to extend previous work (e.g., Menec & Nowicki, 2014) in two ways; first, by examining the association between perceived community age-friendliness and self-reported quality of life using full-scale measures of community age-friendliness (i.e., the AFS) and quality of life; and second, to examine the association while accounting for other variables that could influence the person-environment fit and impact quality of life (e.g., demographics, income adequacy, health status, and social participation; Eales et al., 2008). Demographic variables of age, gender, driving status, and financial situation were included because previous research has shown that quality of life can be lower for older compared with younger adults (Garner et al., 2012), older women compared with older men (Kirchengast & Haslinger, 2008), older adults who have stopped driving (Oxley & Whelan, 2008), and those who have a lower socioeconomic status (Read et al., 2016). Measures of health and social participation were also included as research has shown that older adults who have poorer health (Miret et al., 2014, 2017) and less social participation (Gilmour, 2012) can have lower quality of life. Considering existing evidence, we hypothesized that
perceived age-friendliness would be positively associated with quality of life, after controlling for these variables.

Method

Participants

The recruitment pool for participants consisted of a subsample of older adults who were already participating in the Canadian Driving Research Initiative for Vehicular Safety in the Elderly (Candrive II). The Candrive study was a multicentre prospective cohort study of 928 active drivers aged 70 years and older at baseline. One main objective of Candrive II was to develop a risk stratification tool that would assist physicians in identifying older drivers who may need further investigation of their fitness-to-drive. Eligibility criteria for participating in Candrive were comprehensive, ensuring participants were healthy, active, older drivers (see Marshall et al., 2013). All participants were volunteers. Evidence has shown that the Candrive II sample is equivalent to the broader Canadian population of community-dwelling older drivers in terms of sociodemographic and health variables; however, Candrive II participants were found to drive more frequently than the Canadian population (Gagnon et al., 2016).

Candrive II participants were invited to participate in a longitudinal study on driving cessation; those who agreed served as participants in the present study. The longitudinal study involved participants, both current drivers and former drivers, annually completing a mail-in questionnaire package. In the present study, we examined cross-sectional data from the sixth year of the longitudinal study. This was the single year in which age-friendliness data were collected.

One hundred and 71 older adults participated, 61% of whom were men (104 men, 67 women; in the full Candrive cohort 62% of the participants were men). The participants lived in one of four Canadian cities: Ottawa, Thunder Bay, Toronto, or Victoria. All participants provided written informed consent before participating, and the project was approved by the Ottawa Hospital Research Ethics Board, Lakehead University Research Ethics Board, University Health Network Research Ethics Board, and University of Victoria Human Research Ethics Board.

Measurements

Demographics. We collected participants’ age, gender (man or woman), and driving status (current driver or former driver). As a measure of financial situation, participants were asked to indicate, on a five-point Likert-type scale, how well their income currently satisfied their needs (response options were “very well,” “adequately,” “with some difficulty,” “not very well,” and “totally inadequate”). The age-friendly communities concept is based on the active aging framework, which highlights the salience of gender and economic determinants of aging. Driving status is linked to community mobility and other research has associated it with quality of life outcomes (Webber et al., 2010).

Health. The MOS 36-Item Short-Form Health Survey (SF-36) is a measure of health-related quality of life (Ware & Sherbourne, 1992). The health-related concepts that the SF-36 measures are as follows: limitations in physical activities, limitations in social activities, limitations in usual role activities because of physical health problems, limitations in usual role activities because of emotional problems, bodily pain, general mental health, vitality (energy and fatigue), and general health perceptions. These health domains each contribute to two summary measures: a physical component summary measure (SF-36 physical) and a mental component summary measure (SF-36 mental). For the purposes of this study, only the SF-36 physical measure was used. The SF-36 was constructed for use in research, clinical settings, and general population surveys (Ware & Sherbourne, 1992). The SF-36 has good test-retest reliability, excellent internal consistency, and high criterion validity (Jenkinson et al., 1994; Mishra et al., 2011).

Social participation. The Social Participation Scale (SPS) is a self-report measure of social engagement in activities such as visiting friends and family, shopping, and volunteering (Richard et al., 2009). The SPS has ten Likert-type items, with items based on the Elderly Activity Inventory (Lefrancois et al., 2001), and shows high internal consistency (Richard et al., 2009). In its original conceptualization of age-friendliness, the WHO (2007) identified opportunities for social participation as one of the eight domains of an age-friendly community. Plouffe and Kalache (2010) highlight the importance of social participation for age-friendliness in that “age-integrated as well as age-targeted social participation fosters strong social connections and personal empowerment” (p. 737).

Community Age-friendliness. The Age-Friendliness Survey (AFS) measures perceptions of community age-friendliness (Menec & Nowicki, 2014). The AFS has 54 items, which span nine domains: housing, transportation, safety, outdoor spaces and buildings, information/advocacy, respect and social inclusion, social participation/recreation, community/ work force participation, and health and community services. Items are answered on five-point Likert-type scales, and the tool demonstrates good internal reliability, sensitivity, and specificity (Menec et al., 2016; Menec & Nowicki, 2014).

Quality of life. Quality of life was measured with the WHOQOL-BREF—an abbreviated version of the WHOQOL-100 (WHO, 2004). It has 26 questions, using a five-point Likert scale. The WHOQOL-BREF measures quality of life in four independent areas: physical health, psychological health, social relationships, and environment;
this tool provides a quality of life score for each dimension. The WHOQOL-BREF has demonstrated good reliability and validity in a variety of contexts (Skevington et al., 2004; WHO, 2004).

Analysis

We present descriptive statistics using means and standard deviations. A series of hierarchical multiple regressions were performed to examine the relationship between community age-friendliness and self-reported quality of life. For each WHOQOL-BREF domain, a hierarchical regression was performed with control variables (age, gender, driving status, finances, health, and social participation) entered at Step 1, and control variables plus community age-friendliness entered at Step 2. Of particular interest was whether the change between models (change in the $F$-value) was statistically significant, and the additional proportion of variance that age-friendliness explained.

Results

A total of 171 questionnaires were available for the analyses. We used listwise deletion to remove any participant who had one or more missing data point, leaving 144 questionnaires with complete data for analysis. These questionnaires were completed by 85 men and 59 women, and included 140 drivers and four former drivers. Participants were aged 77–96 years ($M = 83.15$ years, $SD = 4.18$ years). Most participants felt their finances met their needs, with 79 and 54 participants, respectively, indicating that their income satisfied their needs “very well” or “adequately” (nine responded “with some difficulty,” one responded “not very well,” and one indicated “totally inadequate”). Descriptive statistics for all continuous variables are in Tables 1 and 2 shows the correlation matrix.

As shown in Table 3, the hierarchical regression conducted to determine whether community age-friendliness was associated with WHOQOL-BREF: Physical health showed that the control variables entered at Step 1 (age, gender, driving status, finances, SF-36 physical, and SPS) explained 5.0 per cent of the variance in WHOQOL-BREF: Physical health scores, $F(6,137) = 2.25, p < .05$. At Step 1, SF-36 physical ($b$...
### Table 3. Hierarchical Regressions for Each WHOQOL-BREF Domain.

**WHOQOL-BREF:**

**Physical health**

| Model |  $F$ (6,137) | $R^2$ | Adj. $R^2$ | b | $\Delta F$ | $\Delta$ Adj. $R^2$ |
|-------|--------------|-------|------------|---|------------|-----------------|
| 1     | $= 2.25^*$   | .090  | .050       | Age (years) | 0.00        |                 |
|       |              |       |            | Gender      | $-0.23$     |                 |
|       |              |       |            | Driving status | 0.97       |                 |
|       |              |       |            | Finances    | $-0.11$     |                 |
|       |              |       |            | SF-36 PCS$^b$ | $0.02^*$    |                 |
|       |              |       |            | SPS$^c$     | $0.12^*$    |                 |
| 2     | $= 2.84^{***}$ | .128  | .083       | Age (years) | 0.01        | $F(1,136) = 5.95^*$ | .033 |
|       |              |       |            | Gender      | $-0.18$     |                 |
|       |              |       |            | Driving status | 0.69       |                 |
|       |              |       |            | Finances    | $-0.08$     |                 |
|       |              |       |            | SF-36 PCS   | $0.03^*$    |                 |
|       |              |       |            | SPS         | 0.08        |                 |
|       |              |       |            | Age-Friendly Survey$^d$ | 0.03*        |                 |

**WHOQOL-BREF:**

**Psychological health**

| Model |  $F$ (6,137) | $R^2$ | Adj. $R^2$ | b | $\Delta F$ | $\Delta$ Adj. $R^2$ |
|-------|--------------|-------|------------|---|------------|-----------------|
| 1     | $= 1.93$     | .078  | .038       | Age (years) | 0.01        |                 |
|       |              |       |            | Gender      | $-0.09$     |                 |
|       |              |       |            | Driving status | $-0.73$    |                 |
|       |              |       |            | Finances    | $-0.07$     |                 |
|       |              |       |            | SF-36 PCS   | 0.00        |                 |
|       |              |       |            | SPS         | $0.18^{**}$ |                 |
| 2     | $= 3.35^{***}$ | .147  | .103       | Age (years) | 0.02        | $F(1,136) = 11.00^{**}$ | .065 |
|       |              |       |            | Gender      | $-0.02$     |                 |
|       |              |       |            | Driving status | $-1.14$    |                 |
|       |              |       |            | Finances    | $-0.02$     |                 |
|       |              |       |            | SF-36 Social Participation Scale | 0.01        |                 |
|       |              |       |            | Social Participation Scale | 0.13*        |                 |
|       |              |       |            | Age-Friendly Survey | 0.04**        |                 |

**WHOQOL-BREF:**

**Social relationships**

| Model |  $F$ (6,137) | $R^2$ | Adj. $R^2$ | b | $\Delta F$ | $\Delta$ Adj. $R^2$ |
|-------|--------------|-------|------------|---|------------|-----------------|
| 1     | $= 2.52^*$   | .099  | .060       | Age (years) | 0.07        |                 |
|       |              |       |            | Gender      | $1.11^{**}$ |                 |
|       |              |       |            | Driving status | $-0.05$    |                 |
|       |              |       |            | Finances    | $-0.53$     |                 |
|       |              |       |            | SF-36 Social Participation Scale | 0.02        |                 |
|       |              |       |            | Social Participation Scale | 0.05        |                 |
| 2     | $= 3.09^{***}$ | .137  | .093       | Age (years) | 0.08        | $F(1,136) = 5.95^*$ | .033 |
|       |              |       |            | Gender      | $1.21^{**}$ |                 |
|       |              |       |            | Driving status | $-0.55$    |                 |
|       |              |       |            | Finances    | $-0.48$     |                 |
|       |              |       |            | SF-36 PCS   | 0.03        |                 |
|       |              |       |            | Social Participation Scale | $-0.02$    |                 |
|       |              |       |            | Age-Friendly Survey | 0.06*        |                 |

**WHOQOL-BREF:**

**Environment**

| Model |  $F$ (6,137) | $R^2$ | Adj. $R^2$ | b | $\Delta F$ | $\Delta$ Adj. $R^2$ |
|-------|--------------|-------|------------|---|------------|-----------------|
| 1     | $= 5.49^{***}$ | .194  | .159       | Age (years) | 0.05*        |                 |
|       |              |       |            | Gender      | 0.24        |                 |
|       |              |       |            | Driving status | $-0.75$    |                 |
|       |              |       |            | Finances    | $-0.52^{***}$ |                 |
|       |              |       |            | SF-36 PCS   | 0.02        |                 |
|       |              |       |            | Social Participation Scale | 0.13*        |                 |

(continued)
and SPS ($b = .12, p = .043$) were the only variables contributing significantly to the model. When community age-friendliness (AFS) was added to the model at Step 2, the model remained statistically significant, $F(7,136) = 2.84, p < .01$, and explained 8.3 per cent of the variance in WHOQOL-BREF: Physical health scores. The additional variance that AFS explained (adjusted-$R^2$ change = 3.3 per cent) was a significant increase over Step 1, $F(1,136) = 5.95, p = .016$. The variables contributing significantly to the model at Step 2 were SF-36: PCS ($b = .03, p = .019$) and AFS ($b = .03, p = .016$). After controlling for covariates, the more age-friendly a community was perceived to be, the higher participants’ quality of life was in the physical health domain.

This pattern of results was repeated for the other three hierarchical regressions for quality of life scores (WHOQOL-BREF: Psychological health, WHOQOL-BREF: Social relationships, WHOQOL-BREF: Environment), with control variables accounting for between 4 to 16 per cent of the variance for each quality of life measure (see Table 3). When AFS was added to the models, there was a statistically significant increase of three to six and a half per cent in the variance explained. After controlling for covariates, the more age-friendly a community was perceived to be, the higher participants’ quality of life was in the psychological health domain, social relationships domain, and environment domain.

The regression models showed that AFS was associated with all four quality of life domains. This raised the question of whether all nine AFS domains were equally contributing to quality of life, or whether some AFS domains were more influential than others. To investigate, we conducted Pearson correlations between the nine AFS domains and the four WHOQOL domains (see Table 4). Due to the exploratory nature of these analyses, we did not adjust alpha for multiple comparisons. Significant correlations were found for all four quality of life domains and the AFS domains of Safety and Information/advocacy. Significant correlations were found between two of the four quality of life domains and the AFS domains of transportation, outdoor spaces and buildings, and respect and social inclusion. No significant correlations were found between any WHOQOL domain and the AFS domains of Housing, Social participation/recreation, Community/work force participation, and Health and community services.

**Discussion**

We aimed to determine the association between perceived age-friendliness of communities and quality of life. The hierarchical regression models including AFS scores and other covariates explained 8 to 21 per cent of the variance in WHOQOL scores. Community age-friendliness was a statistically significant variable in all models, accounting for 3.3 to 6.5 per cent of additional variance. Thus, this research suggests that a community’s perceived age-friendliness is associated with quality of life for older adults, albeit to a small extent. These results are in accordance with Menec and Nowicki’s (2014) and Nieboer and Cramm’s (2018) research, where higher age-friendliness scores were associated with greater life satisfaction or well-being, and corroborate theories of age-friendliness affecting quality of life (Menec et al., 2011; Nieboer and Cramm, 2018).

Ecologic theory holds that health and quality of life are influenced by the interaction between people and their environment; age-friendly communities have been conceptualized as a solution to support healthy aging (Menec et al., 2011). Using a multiple-item measure of quality of life (rather than a single item as in Menec and Nowicki’s (2014) research), this project provides further confirmation of the association between age-friendliness and quality of life in a
sample of Canadian older adults. This research also builds on existing knowledge by quantifying the extent to which age-friendliness contributes to quality of life after accounting for other variables known to affect quality of life.

Communities investing in age-friendliness initiatives have had difficulty sustaining initial momentum (Russell et al., 2019). Although in this study the contribution of age-friendliness to quality of life was small, even a small contribution can be valuable. Menec and Nowicki (2014) found that higher age-friendliness ratings were associated with better perceived health in older adults. Our study found associations between better perceived health and higher quality of life in the physical health and environment domains. This study lends support to continuing research with age-friendly initiatives; these could lead to an even greater impact over time. Furthermore, the older adults in this study were in reasonably good health, mostly drivers, and already participating in the Candrive study of older drivers (provided by municipal officials) overestimating a community’s age-friendliness when compared with subjective measures (provided by community residents; Menec et al. 2016). Lastly, we had little variability for some of our control variables (e.g., driving status and finances). This is likely a reflection of our sample, where recruitment of individuals already participating in the Candrive study of older drivers ensured our sample was in good health, mostly drivers, and financially secure. Given this study’s use of a sub-sample of the Candrive II study and the requirement that participants be licensed and active drivers at the outset of Candrive II, future research examining the perceptions of age-friendliness among older adults who primarily rely on alternative forms of transportation to attain community mobility should be pursued.

Table 4. Correlations of Age-Friendly Survey Domains and WHOQOL Domains.

| Age-Friendly Survey domain | WHOQOL: Phy* | WHOQOL: Psyb | WHOQOL: Socc | WHOQOL: Envd |
|----------------------------|--------------|--------------|------------|--------------|
| Housing                    | .11          | .14          | .16        | .02          |
| Transportation             | .17*         | .15          | .06        | .21*         |
| Safety                     | .25***       | .17*         | .18*       | .24***       |
| Outdoor spaces and buildings| .14          | .29***       | .13        | .19*         |
| Information/advocacy       | .17*         | .28***       | .19*       | .21*         |
| Respect and social inclusion| .20*        | .23***       | .07        | .15          |
| Social participation/recreation| .10        | .10          | .13        | .12          |
| Community/work force participation| .13    | .16          | .14        | .15          |
| Health and community services| .11          | .16          | .07        | .15          |

*aWHOQOL: Physical health.
*bWHOQOL: Psychological health.
*cWHOQOL: Social relationships.
*dWHOQOL: Environment.
*p < .05. **p < .01
Conclusion
Our data show that a community’s perceived age-friendliness is associated with quality of life in a select group of older adults, albeit to a small extent. Nonetheless, with an aging population, it is imperative that future research focuses on the needs of all older community members. Furthermore, research to identify specific age-friendly factors that contribute the most to quality of life will assist with designing policies, interventions, and communities that promote successful and healthy aging.

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