

NEIGHBOURHOOD AND SOCIAL INFLUENCES ON PARTICIPATION

NEIGHBOURHOOD AND SOCIAL INFLUENCES ON
PARTICIPATION IN EVERYDAY ACTIVITIES AMONG
OLDER ADULTS WITH CHRONIC HEALTH CONDITIONS

BY

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Abstract

Older adults with chronic health conditions experience limitations participating in everyday activities. Neighbourhood characteristics and social support can offset individual impairments and help to facilitate participation; however, gaps in this literature exist. This thesis presents the results of three studies that explore the influence of neighbourhood and social factors on participation in everyday activities among older adults with chronic health conditions. The first paper describes a scoping review of academic literature regarding neighbourhood influences on participation. The findings of the review indicated that neighbourhood economic status, amenities, problems, mobility barriers, cohesion, and safety may influence participation but the pathways through which this occurs are not clear.

The second paper uses findings from a cross-sectional survey (n=248) that examined the relationship between perceptions of neighbourhood characteristics and satisfaction with participation among older adults with chronic health conditions. Path analysis showed that fewer neighbourhood problems directly predict higher participation while higher neighbourhood cohesion and safety indirectly predict higher participation.

The third paper uses data from the same cross-sectional survey to examine the types of social support that most strongly predict satisfaction with participation. Regression analyses showed that participants who perceived greater tangible support and positive social interaction support had more satisfaction with participation than participants with lower levels of these types of support.

The findings in this thesis extend previous research by showing that neighbourhood characteristics influence participation even after accounting for social and individual factors. This research identified a potential pathway from neighbourhood characteristics to participation that includes neighbourhood cohesion and social support and established a link between positive social interaction support and participation. The findings in this thesis help to better understand neighbourhood and social influences on participation. These influences may be addressed through clinical or policy interventions to facilitate participation in older adults with chronic health conditions.

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CHAPTER 1

Introduction

Older adults with chronic health conditions experience limitations in their ability to participate in everyday activities (Cardol et al., 2002). Research in this area has examined personal determinants of participation, such as impairments in physical and mental functioning (e.g., Machado, Gignac, & Badley, 2008). Participation in everyday activities occurs in environmental contexts (World Health Organization (WHO), 2002b) and a growing body of literature has examined environmental influences on participation. The neighbourhood context has been identified as an important influence on participation (King, 2008), however, more research is needed to understand how neighbourhoods impact participation for older adults with chronic health conditions. Social support from neighbours, family and friends is also a predictor of participation (Neugebauer & Katz, 2004), and the specific types of support that are required are not clear. This thesis addresses the topic of neighbourhood and social influences on participation in life activities by older adults with chronic health conditions. Information about determinants of participation can be used to improve quality of life, decrease dependence and decrease the need for healthcare.

The purpose of this chapter is to provide background information about chronic health conditions, participation, and environmental influences on participation. The remaining chapters include three stand-alone manuscripts and a discussion. Each manuscript was written according to the format of the journal to which it will be submitted. Due to the manuscript format of this thesis, some repetition of introductory

material will occur. The manuscript in Chapter 2 describes current literature regarding the influence of neighbourhood characteristics on participation among older adults. The manuscript in Chapter 3 investigates the influence of neighbourhood characteristics on satisfaction with participation using path analysis of survey data. The manuscript in Chapter 4 examines the types of social support that are most linked to satisfaction with participation using regression analysis. Chapter 5 contains a discussion of all findings, overall conclusions and implications of this research.

Chronic Health Conditions

Chronic health conditions are non-communicable conditions with multiple risk factors and long duration (Centre for Chronic Disease Prevention and Control, 2006). The Health Council of Canada studied seven common chronic conditions among adults and older adults, including arthritis, cancer, COPD, diabetes, heart disease, high blood pressure, and mood disorders including depression. Over one in three (39%) adult Canadians and almost three in four (72%) older adult Canadians has at least one of these chronic conditions (Health Council of Canada, 2010). A high proportion (41%) of older adults experience more than one chronic condition (Health Council of Canada). The high prevalence of co-morbid conditions, shared risk factors, and the need for a systematic approach to intervention for all chronic conditions (WHO, 2005) suggest that research in this area should consider chronic conditions together, rather than separately, as proposed in a multidisciplinary and intersectoral research agenda (Hand, Letts, & von Zweck, 2011).

People with chronic conditions are more likely to report poor or fair health and visit their doctor four or more times per year than people without chronic conditions (Perruccio, Power, & Badley, 2007). Presence of chronic conditions, independent of age, predicts increased health care use in Canada (Canadian Institute of Health Information, 2011).

Participation and Chronic Health Conditions

Participation is defined as “involvement in a life situation” (WHO, 2002b, p. 10) and refers to engagement in everyday activities and occupations. Participation includes communication, mobility, domestic life, self care, interpersonal relations, work and education, and community life (WHO, 2002b). The WHO further characterizes participation as involvement in social, economic, cultural, spiritual and/or civic aspects of life (WHO, 2002a). All people have a need to fulfill potential and exercise capacities through participating (Wilcock, 1998). Participation in areas of life such as social activities, employment or productivity, and leisure is a major part of quality of life (Bishop, 2005; Renwick & Brown, 1996). Participation in activities is also inextricably linked with health and each affects the other. Participation is a source of health and health is resource for participating (WHO, 1986; WHO, 2002b).

Participation in any activity is composed of many smaller tasks, such as walking or concentrating, and several different combinations of tasks may make up a given area of participation (Whiteneck & Dijkers, 2009). Many dimensions of participation exist, including frequency, limitation, enjoyment, satisfaction, importance, and variety of participation, as well as where and with whom participation occurs (Law, 2002).

Subjective aspects of participation may be more related to quality of life than objective aspects (Whiteneck & Dijkers, 2009). For example, the ideal frequency of participation can vary from person to person and limitation in a given area of participation may not be perceived as important. Conversely, satisfaction with participation is a universal goal.

People with chronic health conditions experience participation restrictions. While different chronic conditions may have different symptoms, they share similarities in terms of participation restrictions (Cardol et al., 2002; Ewert et al., 2004). People with chronic conditions are more likely to report participation restrictions than people without chronic conditions (Perruccio, Power, & Badley, 2007) and presence of a chronic condition is associated with limitations in participating in a range of activities (Adamson, Lawlor, & Ebrahim, 2004). People with chronic conditions can experience limitations in basic activities of daily living (Oldridge & Stump, 2004) and participate in less leisure-time physical activity than people without chronic conditions (Sawatzky, Liu-Ambrose, Miller, & Marra, 2007). Limitations may also occur in household chores and in community activities (Machado, Gignac, & Badley, 2008) as well as in work, education and leisure (Cardol et al.). Because participation forms a major part of life and health, the participation restrictions faced by older adults with chronic health conditions require attention.

The Environment, Participation, and Chronic Health Conditions

While presence of a chronic condition can influence participation, environmental characteristics can also play a role in promoting or limiting participation (Neugebauer & Katz, 2004). Individuals with chronic conditions often attempt to change their physical

and social environments to adapt to the often unpredictable symptoms of their conditions (Moss & Dyck, 2001). The neighbourhood context is a particularly relevant aspect of the environment for older adults, older adults with disability and people with chronic conditions, as these groups report they spend more time in places closer to home than younger adults, people with less disability and people without chronic conditions (Barnes et al., 2007; Dyck, 2002; Hendrickson & Mann, 2005). Time use patterns also change as people age, and they spend more time in leisure, self-care, and unpaid work activities (Stobert, Dosman, & Keating, 2005), likely in their local areas. People with chronic conditions living in economically deprived areas report the worst health, compared with other people in deprived areas and people with chronic conditions in non-deprived areas (Brown, Ang, & Pebley, 2007).

Several studies have identified links between neighbourhood characteristics and participation among older adults. This literature showed that neighbourhood services, mobility barriers, neighbourhood social cohesion, neighbourhood safety, and neighbourhood problems can influence participation (Bowling & Stafford, 2007; Haak et al., 2008; Keysor et al., 2010; King, 2008; Richard, Gauvin, Gosselin, & Laforest, 2009).

Social support is also relevant to participation. The support may come from people in the individual's neighbourhood or far beyond the neighbourhood. Among older adults with chronic conditions, availability of instrumental family support (Neugebauer & Katz, 2004) and social support from others (Fukukawa et al., 2004) predict higher levels of participation. Information is needed, however, regarding the influence of other types of social support on participation.

Statement of the Problem

Older adults with chronic conditions are often limited in their ability to participate in day to day activities. The neighbourhood and social factors that may facilitate participation have not been fully explored in this group of individuals. Research regarding neighbourhoods is beginning and tends to focus on neighbourhood predictors of frequency of participation without considering the effects of social support. Gaps in this research exist regarding the effect of neighbourhood characteristics on satisfaction with participation, the pathways through which neighbourhood characteristics may influence participation, and the effect of neighbourhood factors on participation when controlling for personal and social factors.

Research regarding social support and participation tends to focus on overall social support or tangible/instrumental social support. Social support is not only tangible but can take the forms of affection, information or companionship. The influence of the specific types of support on participation is unclear. Determining the factors that may improve participation in older adults with chronic conditions can lead to programs or policies that could improve quality of life, decrease dependence, and decrease health care costs.

Theoretical Framework

Two overarching frameworks guided the thesis and were used to ensure a comprehensive examination of participation. The International Classification of Functioning, Disability and Health (ICF) states that participation is influenced by the environment, a person's health condition(s), and other characteristics of the person's

body and mind (WHO, 2002b). The environment encompasses products and technology, the built and natural environment, support and relationships with others, attitudes, and services and policies. The Person, Environment, Occupation model (PEO) also describes how occupational performance, a concept similar to participation, results from interaction between its three components (Law, Cooper, Strong, Stewart, Rigby, & Letts, 1996). The environment is comprised of cultural, socio-economic, institutional, physical, and social components, and the person contains physical, mental and spiritual aspects. Literature related to personal characteristics and participation has identified that decreased participation is related to increased number of chronic health conditions (Marengoni, von Strauss, Rizzuto, Winblad, & Fratiglioni, 2009), difficulty in physical function (Cardol et al., 2002; Machado et al., 2008) and depression (Gignac et al., 2008; Wilkie et al., 2007). Thus, examination of participation needs to consider personal and environmental factors.

Two further theories were used to guide conceptualization of neighbourhood and social factors. Glass and Balfour's (2003) Causal Model of Neighbourhood Effects on Aging does not include the concept of participation but is useful in its focus on neighbourhood characteristics and older adults. The model draws on Lawton's Ecological Model of Aging and identifies four categories of neighbourhood characteristics that have an impact on health for older adults: neighbourhood socioeconomic conditions, which affect neighbourhood social integration, physical aspects of place, and services and resources. These neighbourhood factors combine with personal factors including competencies, characteristics, and presence of chronic illness to influence an individual's behaviour. The behaviour may be adaptive or maladaptive and includes physical activity,

social engagement, active coping and health service utilization. The responses then influence a person's health and functioning. In addition, the neighbourhood factors and personal factors may directly affect health (Glass & Balfour). Within this model, participation may be considered as part of health and functioning.

Berkman, Glass, Brissette and Seeman's (2000) model of social networks and health was also used to understand the impact of the social environment on participation. This model states that social networks lead to social support and opportunities for social participation. These social networks may be influenced by neighbourhood characteristics such as social cohesion. Literature supports these assertions: among older adults with chronic conditions, increased participation is associated with family support (Fukukawa et al., 2004; Neugebauer & Katz, 2004) and large social networks (Zimmer, 1995). This model shows that social networks and social support are important to consider when examining participation.

The four theories and frameworks described here help to understand the complexity of the factors that influence participation. The ICF (2002b) and the PEO (Law et al., 1996) underline the importance of considering personal characteristics when examining environmental characteristics and participation. Glass and Balfour (2003) describe neighbourhood characteristics that may influence health and participation. Berkman and colleagues' model (2000) emphasizes the influence of social networks and social support on participation and suggests possible relationships between factors. Specifically, neighbourhood characteristics such as good social cohesion may help to

create social networks that can lead to social support and participation. Figure 1 presents a conceptual model that describes these predictors of participation.

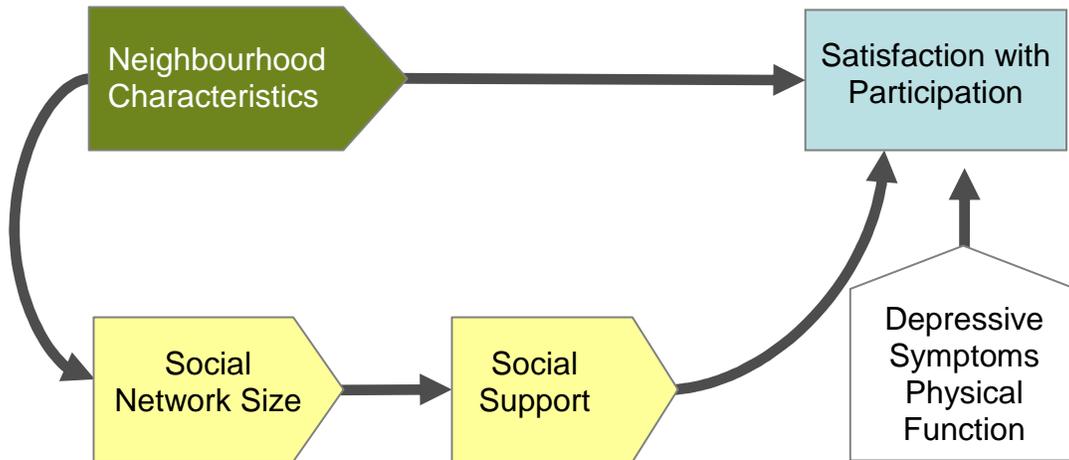


Figure 1. Neighbourhood and social predictors of participation.

Within this thesis, neighbourhood was defined as an area containing places that are within a 15-20 minute walk from home (Bowling & Stafford, 2007). Neighbourhoods can also be defined by census tracts, combinations of census tracts, existing subdivisions and historical areas (King, 2008) or community consultation (Jones, van Sluijs, Ness, Haynes, & Riddoch, 2010). Some studies offer no definition but instead ask about the neighbourhood in which the person lives (Keysor et al., 2010). A study that compared 10 different definitions of neighbourhoods, based on enumeration districts, community-identified areas, or computer-generated areas, found that the method used to define neighbourhood had little effect on estimates of physical activity (Jones et al., 2010). Pilot testing of the questionnaire used in this thesis indicated that a 15-20 minute walking distance was an accurate definition of neighbourhood for older adults. Naming this

distance encouraged the participants to focus on the local area, rather than a larger area such as ‘the east end of the city’.

Neighbourhood characteristics may be measured objectively, such as by crime rates, or subjectively, such as by perceptions of safety. The relationship between objectively and subjectively measured neighbourhood characteristics and differences in their impacts upon participation are not well understood. In this thesis, neighbourhood characteristics were measured subjectively. While objective neighbourhood characteristics likely influence perceptions, it is ultimately an individual’s perceptions that affect his or her behaviour.

The first manuscript in this thesis examines literature regarding neighbourhood characteristics and participation. The second and third manuscripts incorporate this literature and draw on the theories discussed above to develop research objectives and methods.

Research Objectives

The purpose of paper 1 (Chapter 2) was to describe a scoping review of academic literature regarding neighbourhood influences on participation among older adults with chronic health conditions. The purpose of paper 2 (Chapter 3) was to examine the influence of perceptions of neighbourhood characteristics on satisfaction with participation in everyday activities among 248 older adults with chronic health conditions. The specific objectives of the study were to (1) test a model examining the influence of perceptions of neighbourhood characteristics and the individual’s social environment on satisfaction with participation in everyday activities and (2) test the

applicability of the model to different genders and age groups. The aim of paper 3 (Chapter 4) was to examine the types of social support that most strongly predict satisfaction with participation and to examine predictors of social support for older adults with chronic health conditions.

**CHAPTER 2: Neighbourhood Influences on Participation among Older Adults with
Chronic Health Conditions: A Scoping Review**

Preface

This chapter contains a manuscript entitled “Neighbourhood Influences on Participation among Older Adults with Chronic Health Conditions: A Scoping Review”. The authors are: C. Hand, M. Law, M.A. McColl, S. Hanna, and S. Elliott. My contribution to this work includes conceiving the idea for the paper, developing the search strategy, performing the literature search, and writing the article. The co-authors contributed to each of these aspects of the paper. The search was performed in summer 2009 and updated in October 2010 and April 2011. The article was written from fall 2010 to spring 2011. The target journal for this paper is the Occupational Therapy Journal of Research: Occupation, Participation and Health. This journal accepts articles of approximately 6000 words. The present manuscript is slightly longer than this limit but was not reduced at this point in order to provide more information to the examining committee.

Abstract

Older adults with chronic health conditions face difficulties participating in everyday occupations but may gain support to do so from neighbourhood environments. The purpose of this paper is to describe research regarding neighbourhood influences on participation among older adults with chronic conditions. A scoping review of articles in Cinahl, Geobase, Medline and Social Science Citation Index resulted in 689 articles. Fifteen articles met the selection criteria. Findings indicate that neighbourhood economic status, amenities, mobility barriers, problems, cohesion and safety are linked to participation in older adults and older adults with chronic conditions. Most studies measured participation in terms of frequency or limitation, considered individual covariates and did not consider social support as a covariate. The findings of this review can guide research to examine a range of neighbourhood characteristics while considering the effects of the individual's characteristics and social support. Longitudinal and qualitative research can also help to understand this complex area of study.

Key words: Chronic disease, participation, older adults, human activities, residence characteristics, social environment

Introduction

Older adults with chronic health conditions experience decreased participation in occupations (Perruccio, Power, & Badley, 2007) which constitutes a risk for disease (Sundquist, Lindstrom, Malmstrom, Johansson, & Sundquist, 2004), depression (Glass, Mendes de Leon, Bassuk, & Berkman, 2006) and death (Lennartsson & Silverstein, 2001). Neighbourhood characteristics can facilitate or impede participation (Lindstrom, Merlo, & Ostergren, 2002). Neighbourhoods may be particularly important for older adults with chronic conditions because they spend more time close to home (Barnes et al., 2007). People with chronic conditions often experience individual limitations in physical and psychological function (Machado, Gignac, & Badley, 2008), requiring more environmental support to maintain participation in life activities.

Research into neighbourhood effects upon older adults tends to focus on how neighbourhood characteristics relate to general health or physical activity/walking. This research shows a strong relationship between poor health and low neighbourhood affluence (Pickett and Pearl, 2001). Health among older adults is also associated with presence of neighbourhood facilities, problems in an area such as noise, crime, and air pollution and neighbourhood cohesion (Bowling, Barber, Morris, & Ebrahim, 2006; Pollack & Von Dem Knesebeck, 2004; Walker & Hiller, 2007).

Walking and physical activity among older adults appears related to area income level (Fisher, Li, Michael, & Cleveland, 2004). Other neighbourhood characteristics related to walking and physical activity include neighbourhood facilities (Nagel, Carlson, Bosworth, & Michael, 2008), well-maintained sidewalk or bike paths (Strach, Isaacs, &

Greenwald, 2007), neighbourhood cohesion (Fisher et al., 2004), and neighbourhood safety (Tucker-Seeley, Subramanian, Li, & Sorensen, 2009). A recent systematic review of studies regarding neighbourhood influences on physical activity among older adults found inconsistencies in results across studies, methodological limitations such as unstandardized measurement tools and little examination of moderators such as gender and age, and a need for more research (Van Cauwenberg, et al., 2011).

This body of research on health and physical activity suggests factors that may affect participation among older adults and older adults with chronic conditions. But because participation differs conceptually from health and physical activity, the relevant neighbourhood characteristics may be different. Health is a sense of physical, mental and social well-being (World Health Organization [WHO], 1986), and physical activity refers to a narrow area of human life. Conversely, participation is “involvement in a life situation” (WHO, 2002b, p. 10) and includes a broad range of occupations, from household management to leisure to caring for oneself. It also involves social, economic, cultural, spiritual and/or civic aspects of life (WHO, 2002a). Frameworks such as the Person, Environment, Occupation (PEO) model (Law, Cooper, Strong, Stewart, Rigby, & Letts, 1996) and the International Classification of Functioning, Disability and Health (ICF, WHO, 2002b) posit that participation is influenced by multiple factors within the environment and the person. Social support is another environmental factor that can affect participation among older adults (Fukukawa et al., 2004; Neugebauer & Katz, 2004); it is a particularly important factor as 41% of older adults who receive support

related to a long-term health condition receive it from family or friends (Statistics Canada, 2003).

Research into neighbourhood influences on participation in occupations is beginning, especially as it relates to older adults with chronic conditions. Understanding the current state of literature in this area can provide a solid base from which to examine neighbourhood influences on participation and determine ways that neighbourhoods can be structured to facilitate participation. The purpose of this study was to perform a scoping review to describe and synthesize research regarding the influence of neighbourhood characteristics on participation among older adults with chronic conditions.

Methods

Using the method described by Arksey and O'Malley (2005), the scoping review mapped research in the area of neighbourhood characteristics and participation among older adults and older adults with chronic conditions. A scoping review methodology was selected because it can summarize the range of research in an area to support development of research questions and proposals (Rumrill, Fitzgerald, & Merchant, 2010). Scoping reviews do not usually evaluate quality of the material (Rumrill et al.) and given the emerging nature of this area of inquiry, study quality was not evaluated. The review focused on describing study design, measurement of variables and results and addressed the question: How do neighbourhood characteristics influence participation among older adults with chronic health condition(s)?

Searches were completed in CINAHL, Geobase, Medline, and Social Science Citations in the years 1990-early 2011 inclusive. In CINAHL and Medline medical subject headings (MeSH) were used and in Geobase and SSCI keywords or title keywords were used. Searching the topics participation and neighbourhoods is challenging because many terms are used to describe each topic area. The search terms were therefore broad in order to include all potential articles. Three topic areas were combined and search terms included:

- **Population** terms (MeSH: aged; aged, 80 and over; Keywords: aged, elderly, older adult)
- **Participation** terms (MeSH: human activities, activities of daily living, home maintenance, leisure activities, physical activity, work, occupation(human), Title keywords: participation, activit*)
- **Neighbourhood** terms (MeSH: environment, communities, residence characteristics, architectural accessibility, social environment, Title keywords: neighbo(u)rhood, community, environment).

Searches were also completed to remove irrelevant articles. Articles were removed if they included the MeSH terms brain diseases; spinal cord injuries; child; mental disorders (except depression) or keywords brain or dementia.

Articles were selected if they reported on neighbourhood characteristics that may affect participation and also met the following criteria: published in English; at least half the sample was age 55 years or more; and the sample included participants with a chronic condition such as arthritis, diabetes, heart disease, chronic obstructive pulmonary disorder

or depression or no had known health condition. All study designs were included.

Articles were excluded if they focused exclusively on individuals with a diagnosis other than the selected chronic conditions, such as developmental disability, effects of polio, mental illness, stroke or spinal cord injury.

After searching, the articles were screened by one reviewer by title/abstract only and articles that did not meet the search criteria were set aside. The remaining articles were examined by two reviewers who independently made selections and came to a consensus. Reference lists of selected articles were reviewed to identify novel articles. Figure 1 contains information on the search results and articles that did not meet the selection criteria.

Each selected article was reviewed and data was charted (Arksey & O'Malley, 2005) according to citation, population, design, analysis, variable measurement, and results. To categorize results, neighbourhood variable names used in the articles were noted. Variables that were repeated across articles were used as category headings and study results were summarized according to these headings. When different wording was used for variable names, individual scale items were examined to determine the appropriate category for the study results.

Results

Study Descriptions

The search resulted in 15 articles (see Table 1 for summaries). Two articles reported on the same data in different levels of detail (Keysor et al., 2010; White et al., 2010). Thirteen of the studies were survey designs and one used qualitative methods.

Four studies (five articles) included participants with chronic condition(s) while ten did not mention presence or absence of chronic conditions. One study included adults age 18 or more years (mean age=68 years), one study included adults age 45-68 years (median age=57 years), nine studies focused on adults age 50 or more years, and three studies focused on older age groups (age 80 or 82 or more years).

Study Findings

The studies reported on seven main categories of neighbourhood characteristics that influence participation: neighbourhood location, neighbourhood economic status and demographic characteristics, neighbourhood amenities, neighbourhood mobility barriers, neighbourhood problems, neighbourhood cohesion and neighbourhood safety.

Neighbourhood location.

Lindstrom, Merlo, and Ostergren (2002) compared 90 different neighbourhoods and found that neighbourhood of residence accounts for a small but significant proportion (2.6%) of the variance in frequency of social participation after adjusting for age, gender and job status. Independence in activities of daily living (ADL) and instrumental activities of daily living (IADL) participation also differs by neighbourhood location (Clarke & George, 2005). People in rural areas report more difficulty in personal care and communication participation than people living in urban or metropolitan areas (Therrien & Desrosiers, 2010).

Neighbourhood economic status and demographic characteristics.

The economic status of a neighbourhood is usually measured by a composite indicator that may include average household income, unemployment rate, or median

educational status of residents. Low neighbourhood affluence is associated with lower frequency of social activities (Bowling & Stafford, 2007), difficulty in ADL and community mobility participation (Beard et al., 2009) and difficulty in ADL participation for men (Freedman, Grafova, Schoeni & Rogowski, 2008). Area economic advantage also decreases the likelihood of difficulty in IADL participation in men when controlling for demographic variables but not when controlling for other neighbourhood characteristics (Freedman et al., 2008). Difficulty in ADL and community mobility participation is also related to residential instability and low proportions of foreign born/high proportions of Black residents (Beard et al., 2009).

Neighbourhood amenities.

Amenities such as stores, transportation, and health care in a neighbourhood are linked to participation. Low land-use diversity is associated with lower independence in IADL participation in people with lower extremity functional difficulties (Clarke & George, 2005). Perceptions of the quality of local services (e.g. leisure/social facilities, facilities for older adults, trash collection, local health services, transportation, stores, and a pleasant place to walk) are linked to higher number of social activities performed (Bowling & Stafford, 2007). Perceptions of presence of shops and services, good medical care, cultural opportunities and local transportation are also linked to higher level of participation (Haak, Fange, Horstmann, and Iwarsson, 2008). Perceptions of accessibility of services/amenities are linked to higher frequency of social participation (Richard, Gauvin, Gosselin, and Laforest, 2009). Amenities included good quality, affordable food; a range of stores and services; leisure activities; facilities for physical activities;

welcoming restaurants; a library or a cultural centre; a place of worship; and services for older adults. People with poor access to public transportation are more likely to report difficulty in daily activities, but not when controlling for other variables (Therrien & Desrosiers, 2010) and difficulty in community mobility (Wilkie, Peat, Thomas & Croft, 2007). Transportation facilitators such as nearby public transportation and public transportation that is adapted for people with limitations are linked to lower limitation in overall participation (Keysor et al., 2010). These transportation facilitators also include personal characteristic and resources such as the ability to drive and access to a car. In examining specific transportation facilitators and types of participation, White and colleagues (2010) found that adequate handicap parking is associated with frequency of visiting friends and family, going out with others to public places, providing care to others and working at a volunteer job. Nearby public transportation is linked with less limitation in visiting friends and family, taking care of the home, working at a volunteer job, active recreation, inviting people in for a meal, going out with others to public places, taking part in organized social activities, and preparing meals for oneself (White et al., 2010). Finally, lack of parks and walking areas is linked to low frequency of participation in a regular fitness program and organized social activities (White et al., 2010). Reports from older adults corroborate these findings, stating that nearby parks or outdoor recreation areas, public spaces and benches facilitate social participation (Hovbrandt, Fridlund, & Carlson, 2007).

Neighbourhood mobility barriers.

Older adults report that physical barriers such as uneven sidewalks and high steps on buses can limit participation (Hovbrandt, Fridlund, & Carlsson, 2007). Good sidewalk condition is linked to higher frequency of community-based participation (King, 2008) and perceived physical barriers such as high curbs and uneven pavement are linked to lower frequency of participation outside the home (Hovbrandt, Stahl, Iwarsson, Horstmann, & Carlsson, 2007). Greater community mobility barriers (e.g. uneven sidewalks, lack of places to sit or curb cuts) are linked to greater limitation in community participation and less limitation in home and social participation (Keysor, Jette, Coster, Bettger & Haley, 2006). Greater community mobility barriers also increase the likelihood of limitation in overall participation (Keysor et al., 2010). The barriers scale used in these studies (Keysor et al., 2006, 2010) also includes items that could be considered neighbourhood amenities, such as availability of accessible parks and walking areas and places to sit and rest. Street connectivity, as a measure of neighbourhood walkability, is linked to less difficulty in IADL participation in men (Freedman et al., 2008). Low housing density, another indicator of lower walkability, is linked to lower independence in ADL participation among older adults with lower extremity functional limitations (Clarke & George, 2005). Street characteristics including low density of intersections are also related to difficulty in community mobility (Beard et al., 2009).

Neighbourhood problems.

Aspects of neighbourhood built or social environments that are perceived as negative are linked to lower participation. Presence of litter, poor yard maintenance, and

window bars are linked to lower frequency of participation in community activities (King, 2008). Perceived social cohesion mediates these three relationships and perceived safety from crime mediates the relationship between yard maintenance and participation (King).

Neighbourhood cohesion.

Neighbourhood social cohesion, sense of belonging, or feelings of trust and respect (Stansfield, 2006) can influence participation. Specifically, perception of good neighbourhood cohesion is related to higher frequency of social (Bowling & Stafford, 2007, Richard et al., 2009) and community participation (King, 2008). Perceptions of living close to friends & relatives or social network are also linked to higher level of participation (Haak, 2008) and greater frequency of social participation (Richard et al., 2009). Finally, low area-based social cohesion and social control are related to difficulty in community mobility (Beard et al, 2009).

Neighbourhood safety.

Perceived neighbourhood safety is linked to greater number of social activities performed (Bowling & Stafford, 2007). Perceptions of fear- or safety-related problems are also linked to lower frequency of out-of-home participation (Hovbrandt, Stahl, et al., 2007). Problems include general feelings of insecurity, perceptions of risk of robbery or fear of falling. High area crime rate/racial segregation is associated with difficulty in IADL participation in women when controlling for demographic variables but not when controlling for other neighbourhood characteristics (Freedman et al., 2008). High crime levels are associated with difficulty in ADL participation (Beard et al., 2009).

In summary, these findings correspond with literature regarding neighbourhood characteristics and health or physical activity for older adults. Older adults' participation is optimized when neighbourhoods have higher economic affluence, local amenities, few barriers to mobility, few problems, good social cohesion and sense of safety. Figure 1

Measurement of Concepts

The 15 articles identified in the scoping review examined a range of neighbourhood characteristics. These included neighbourhood amenities or indicators of land-use diversity (Beard et al., 2009; Bowling & Stafford, 2007; Clarke & George; Freedman et al., 2008; Haak et al., 2008; King, 2008; Richard et al., 2009; Therrien & Desrosiers, 2010). The availability of local transportation and other transportation facilitators was frequently assessed (Beard et al., 2009; Bowling & Stafford, 2007; Haak et al., 2008; Keysor et al., 2006, 2010; King, 2008; Richard et al., 2009; Therrien & Desrosiers, 2010; Wilkie et al., 2007). Other neighbourhood characteristics included physical barriers to mobility (Beard et al., 2009; Hovbrandt, Stahl, et al., 2007; Keysor et al., 2006, 2010; King, 2008; Richard et al., 2009) and problems such as traffic, pollution or crime (Beard et al., 2009; Bowling & Stafford, 2007; Clarke & George, 1995; Hovbrandt, Stahl, et al., 2007; King, 2008). Several studies examined social cohesion/sense of belonging (Beard et al., 2009; Bowling & Stafford, 2007; Haak et al., 2008; King, 2008; Richard et al., 2009) and safety (Beard et al., 2009; Bowling & Stafford, 2007; Clarke & George, 2005; King, 2008; Hovbrandt, Stahl, et al., 2007; Therrien & Desrosiers, 2010). Finally, three studies examined area economic conditions (Beard et al., 2009; Bowling & Stafford; Freedman et al., 2008). In most studies, findings

were non-significant for at least one neighbourhood characteristic. The studies by Beard et al. (2009), Bowling and Stafford (2007) and King (2008) examined the greatest variety of neighbourhood characteristics. All three studies assessed neighbourhood amenities, problems, safety and cohesion, while King and Beard et al. also assessed physical barriers to mobility and Beard et al. also assessed socioeconomic status.

Neighbourhood characteristics were usually assessed subjectively by asking study participants about their perceptions about their neighbourhoods. Five studies used other forms of data. Lindstrom et al. (2002) did not assess any neighbourhood characteristics but instead noted the location of each neighbourhood. Beard et al. (2009) used census data and Clarke & George (2005) used census information as well as participant perceptions. Freedman et al. (2008) linked census and other neighbourhood data to survey data. King (2008) assessed participants' perceptions and performed walking audits.

The studies also examined a range of types of participation, including social participation (Bowling & Stafford, 2007; Lindstrom et al., 2002; Richard et al., 2009), community participation (Hovbrandt, Fridlund, & Carlsson, 2007; Hovbrandt, Stahl, et al., 2007; King, 2008), ADL and IADL participation (Beard et al., 2009; Clarke & George, 2005; Freedman et al., 2008), mobility (Beard et al., 2009; Wilkie et al., 2007) and overall participation (Haak et al., 2008; Keysor et al., 2006, 2010; Therrien & Desrosiers, 2010; White et al., 2010). Participation was most often measured in terms of frequency of performing activities (Bowling & Stafford, 2007; Hovbrandt, Stahl, et al., 2007; King, 2008; Lindstrom et al., 2002; Richard et al., 2009). Other authors assessed

independence (Clarke & George, 2005) or limitation (Beard et al., 2009; Freedman et al., 2008; Keysor et al., 2006; Therrien & Desrosiers, 2010) or both frequency and limitation (Keysor et al., 2010; White et al., 2010). One study assessed satisfaction with mobility (Wilkie et al., 2007) and Haak et al., (2008) created two composite measures based on several items that assessed level of participation. The qualitative study by Hovbrandt, Fridlund, & Carlsson, (2007) assessed participation using open-ended questions.

Most studies in the review included person-related covariates in their analyses. Haak and colleagues (2008) and Hovbrandt, Stahl and colleagues (2007) reported on bivariate correlations and therefore did not control for the effects of individual characteristics and Beard et al., (2009) controlled for neighbourhood characteristics only. One study in the review controlled for the effect of social support on participation (Keysor et al., 2006) while the remaining studies did not.

Discussion

The scoping review results suggest that neighbourhood characteristics are important factors to consider in addressing participation restrictions in older adults with chronic health conditions. The review identified seven types of neighbourhood characteristics that can potentially influence participation (neighbourhood location, economic status, amenities, mobility barriers, problems, cohesion, and safety). The findings of the review established that participation can vary by neighbourhood location and that the economic status of the neighbourhood influences participation. Several studies found that neighbourhood amenities such as presence of stores or public transportation are related to increased participation and barriers to mobility such as

uneven sidewalks and lack of curb cuts are related to decreased participation. One study showed that neighbourhood problems such as traffic are linked to decreased participation and several others showed that neighbourhood cohesion and safety are related to increased participation.

The neighbourhood characteristics that appear to affect participation the most are neighbourhood amenities, including public transportation, and neighbourhood mobility barriers. These two characteristics have been studied the most often and significant relationships were usually identified. Neighbourhood cohesion was also examined frequently and significant relationships were noted. Neighbourhood safety and problems were studied less frequently and a few studies failed to identify relationships with participation.

The impact of neighbourhood characteristics on participation can be interpreted in two ways. Local amenities, safety, and few problems and mobility barriers may draw people into neighbourhoods, leading them to make connections with each other (Berkman, Glass, Brissette, & Seeman, 2000; Day, 2008) and engage in social participation. The study by King (2008), which found that fewer neighbourhood problems can predict greater social cohesion which predicts more frequent participation, supports this perspective. Another possible explanation is that presence of local amenities, a safe environment and few problems and barriers to mobility encourage older adults to walk in their neighbourhoods and get exercise while doing daily activities (Glass & Balfour, 2003; Michael, Green, & Farquhar, 2006). This increased exercise may lead to increased ability to participate in all types of occupations.

The scoping review used broad search terms in a range of databases and likely captured the research in this area. The studies included in the review used a narrow range of designs and often defined participation in terms of frequency or limitation. These limitations may affect the validity of the conclusions developed here. Another limitation relates to the intent to focus on older adults with chronic conditions. Five of the articles (four studies) identified in the scoping review stated the sample included people with chronic conditions while the remaining studies focused on older adults. Given that roughly three-quarters of older adults have at least one chronic condition (Health Council of Canada, 2010), the scoping review results can still be considered applicable to older adults with chronic conditions. The results can also apply to older adults more generally.

Scoping reviews can be an effective way to disseminate information (Arksey & O'Malley, 2005) especially, as in this review, when they include literature from different fields of study. The scoping review findings can be useful to occupational therapy and public health practitioners in suggesting areas to address. Occupational therapists may not typically consider assessments and interventions that address neighbourhood characteristics, and public health practitioners may not usually address participation outcomes. The findings can also be useful to policy makers in providing support for making changes to neighbourhoods. The findings can be useful to researchers in supporting funding applications.

More research into neighbourhood influences on participation in older adults is needed, with a focus on older adults with chronic conditions. Research in this area will be most informative if it examines a range of neighbourhood characteristics and includes

relevant covariates such as the individual's characteristics and social environment. Individual characteristics and social support are strong predictors of participation that may overshadow the impact of neighbourhood characteristics. In addition, examining a combination of factors can help to better understand the complex relationships at play. Dimensions of participation beyond frequency and limitation can also be considered. Participation can be assessed in terms of frequency, enjoyment, satisfaction, importance, variety of activities performed, and where and with whom participation occurs (Law, 2002). These different dimensions can yield different results, for example, role importance is distinct from satisfaction with role performance for older adults with chronic conditions (Gignac et al., 2008). Participation may be best measured by the individual in terms of satisfaction, rather than against external norms or standards (Wilkie, Peat, Thomas, Hooper & Croft, 2005). Longitudinal research can also help to identify potential causes and effects, and qualitative research can help to understand neighbourhood impacts in more depth. As more information is gained, further steps may include intervention studies that seek, for example, to increase neighbourhood cohesion.

Conclusion

This scoping review showed that neighbourhood economic status, amenities, mobility barriers, problems, cohesion and safety are linked to participation in older adults with chronic conditions. These results can be used in clinical practice, policy and research regarding older adults and older adults with chronic conditions. Future research can examine a range of neighbourhood characteristics while considering the effects of the individual's characteristics and social support. Longitudinal and qualitative research can

also help to understand this complex area of study. Research in this area has the potential to improve participation, health and quality of life for older adults with chronic conditions.

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Figure 1. Literature Search Results and Reasons for Exclusion

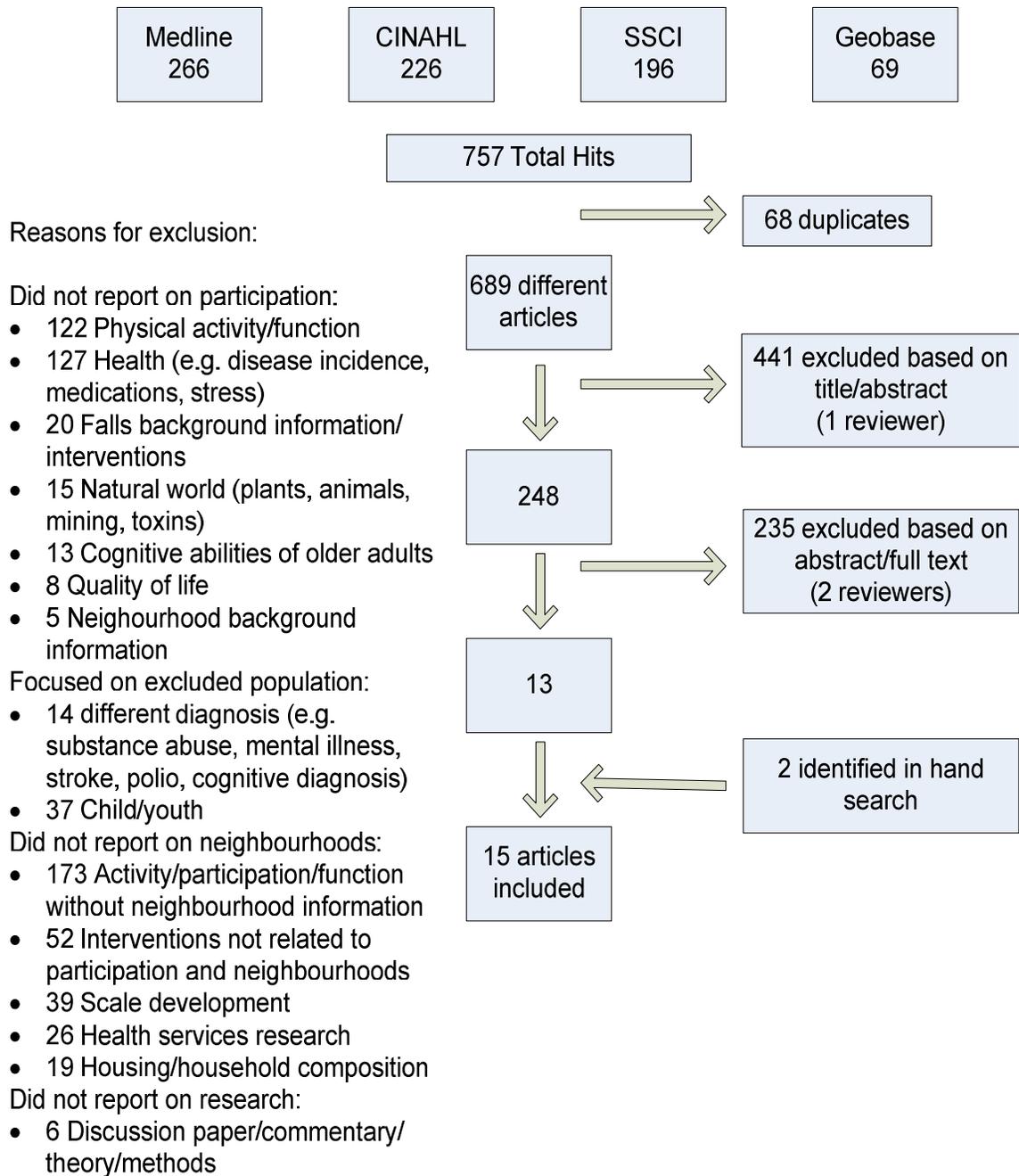


Table 1
 Article Summaries including Neighbourhood Characteristics associated with Participation

Author(s)	Design, N, sample, analysis	Participation Measurement	Neighbourhood Measurement	Participation Type						
				ADL	IADL	Mobility	Community	Social	Overall	
Beard et al., 2009	Cross-sectional survey. N not stated, census data. Age 65+ Multiple regression, adjusted for other neighbourhood characteristics.	Difficulty in ADL (presence of any difficulty in dressing, bathing, or getting around inside the home) and community mobility (presence of any difficulty going outside the home alone to shop or visit a doctor's office).	Census data: Low socioeconomic status Residential instability Racial/ethnic composition Crime Mixed land use Neighbourhood decay (filthy streets, sidewalks, distance to subway) Through routes (high speed limits) Street characteristics (density of intersections, trees on streets, close to a bus stop) Social cohesion/social control	*		*				
Bowling & Stafford, 2007	Cross-sectional survey. N=761 Age 65+ Multilevel modeling, adjusted for area affluence and individual demographics,	Physical difficulty in ADL/IADL, frequency of social activities.	Neighbourhood affluence. Perceptions of: Social cohesion Quality of facilities Problems (traffic, noise, crime, air quality, litter, graffiti) Safety					*	*	*

	health status and optimism.								
Clarke & George, 2005	Cross-sectional survey. N=4154 Age 65+ Multiple regression, adjusted for demographic variables.	Assistance needed in ADL (bathing, dressing, eating, transferring, and using the toilet) and instrumental ADL (using the telephone, driving or traveling alone on buses or taxis, shopping, preparing meals, doing light housework, taking medications, managing money).	Census data: Housing density Land-use diversity Car-dependent environment Perception of: Safety from crime	* ^a	* ^a				
Freedman, Grafova, Schoeni, & Rogowski, 2008	Cross-sectional survey. N=15,480 Age 55+ Multilevel modeling, adjusted for demographics and neighbourhood variables.	Difficulty in ADL (bathing, dressing, eating, transferring, walking, or toileting) and IADL (managing money, using a telephone, managing medications, shopping, or cooking).	Secondary data indicators of: Street connectivity Population density Food store and restaurant density Air pollution Access to health care Immigration Residential stability Racial segregation Age distributions Crime rate Area economic disadvantage		* ^b				
Haak et al., 2008	Longitudinal survey. N=314 Age 80+ and living alone.	Time 2: Level of participation in performance-oriented participation (fitness, leisure, IADL,	Time 1: Perceptions of neighbourhood: Living near the action Access to shops and services Good medical services nearby						*

	Median diseases=5 Correlations.	independence) and togetherness-oriented participation (social leisure, social activity centres, home participation, participation outside home).	Close to friends and relatives Cultural opportunities nearby Neighbourliness Local transportation		*			*	*	*
Hovbrandt, Fridlund, et al., 2007	Exploratory phenomenography N=21 Age 82-90	Semi-structured interviews focused on the experience of participation outside the home.	Parks, public spaces, outdoor recreation areas and benches. Uneven sidewalks, high steps on buses.					*		*
Hovbrandt, Stahl, et al., 2007	Cross-sectional survey. N=97 Age 80+ Correlations	Frequency of performing community activities and satisfaction with frequency of activity.	Perceptions of: Overall outdoor environment Number of problems as a pedestrian related to: Anxiety and fear (general feeling of insecurity; bad lighting; fear of meeting with traffic incident; fear of falling; fear of robbery, assaults, threats) Risk for accident (fast traffic; dense traffic; problems with crossing streets; signal light crossing) Physical barriers (high curbs; uneven sidewalks) Lack of comfort (few benches) Risk for conflicts with other unprotected road users (bikes, mopeds).				*		*	
Keysor, Jette,	Cohort study (1 and 6 months post	Participation Measure for Post-Acute Care	HACE subscales: Community mobility barriers	*	*			*e		

Coster, Bettger, & Haley, 2006.	hospital discharge) N=342 Age 18+, mean=68, SD=14, chronic health (44%), traumatic orthopedic (33%), or neurologic (23%) conditions. Multiple regression adjusted for home, technology and social support factors, function, and demographics.	(limitation in home/social participation and community participation).	Transportation facilitators						
Keysor et al., 2010	Cross-sectional survey. N=435 Age 65+ knee OA or risk of knee OA. Multiple logistic regression adjusted for function and demographics.	Late-Life Disability Instrument (daily activity limitation and daily activity frequency).	HACE subscales: Community mobility barriers Transportation facilitators.						* *
King, 2008	Cross-sectional survey. N=190 Age 65+, mean of 2-3 chronic conditions.	Frequency of community-based activities.	Neighbourhood walking audits: Sidewalk functionality Safety from traffic Number of destinations Aesthetics (e.g. litter) Social capital (e.g. window bars)				* * *		

	Multilevel modeling adjusted for demographics.		Mediators tested: perceptions of: Access to amenities Traffic and crime safety Neighbourhood social cohesion				*	*	
Lindstrom, Merlo, & Ostergren, 2002	Cross-sectional survey. N=13,335 Age 45-68 (median 57). Multilevel logistic regression, adjusted for age, gender, job status.	Frequency of engaging in social groups.	Differences across 90 neighbourhoods					*	
Richard et al., 2009	Cross-sectional survey. N=282 Age 58+ Multiple regression, adjusted for demographics and health.	Frequency of performing social activities.	Perceptions of: Sense of belonging Good neighbourhood for seniors Proximity to social network Walkability Availability of a local transit stop Walking distance to services/amenities Accessibility of services/amenities					* ^f * ^f * ^f * ^f * ^f *	
Therrien & Desrosiers, 2010	Cross-sectional survey. N=350 Age 65+ Multiple regression adjusted for demographics, living situation,	Assessment of Life Habits (difficulty/type of assistance in Daily Activities and Social Roles).	Differences across urban, rural and metropolitan areas Perceptions of: Access to stores Access to public transportation Feeling of security in neighbourhood	* ^f * ^f					

	access to stores and transportation.								
White et al., 2010	Cross-sectional survey. N=436 Age 65+, with knee OA or risk of knee OA. Multiple regression adjusted for demographics, comorbidities, function.	Late-Life Disability Instrument (daily activity limitation and daily activity frequency).	HACE items: Uneven sidewalks or other walking areas Parks and walking areas that are easy to get to and easy to use Safe parks or walking areas Places to sit and rest at bus stops, in parks, or in other places where people walk Curbs with curb cuts Public transportation close to home Adequate handicap parking						* * *
Wilkie, Peat, Thomas & Croft, 2007	Cross-sectional survey. N=2252 Age 50+ (mean 65) with knee pain. Logistic regression adjusted for demographics, physical function, knee pain, health conditions, mobility aids and car access.	Keele Assessment of Participation item on mobility outside the home	Perception of: Access to public transportation			*			

Notes: * indicates a significant relationship. OA=osteoarthritis; ADL=Activities of daily living; IADL=instrumental activities of daily living; HACE=Home and Community Environment assessment; HACE community mobility barriers: uneven sidewalks or other walking areas, parks and walking areas that are easy to get to and easy to use, safe parks or walking areas, places to sit and rest at bus stops, in parks, or in other places where people walk, curbs with curb cuts; HACE transportation facilitators: public transportation that is close to your home, public transportation with adaptations for people who are limited

in their daily activities, handicap parking, have a car available to you at your home, able to drive. If diagnosis is not stated then it was not stated in article.

a=among people with functional limitations; b=men only; c=women only; d=does not hold when controlling for other neighbourhood characteristics; e=greater mobility barriers predict more home and social participation; f=bivariate analyses such as correlations/t-tests.

CHAPTER 3: Neighbourhood Influences on Participation in Activities among Older Adults with Chronic Health Conditions

Preface

This chapter contains a manuscript entitled “Neighbourhood Influences on Participation in Activities among Older Adults with Chronic Health Conditions”. The authors are: C. Hand, M. Law, S. Hanna, S. Elliott, and M.A. McColl. My contribution to the paper was to develop the research proposal, perform data collection and all analyses, and write the paper. The co-authors contributed to each of these aspects of the paper. The proposal was approved in fall 2009, data collection occurred in winter to spring 2010, and analysis occurred in fall 2010 and writing occurred from fall 2010 to spring 2011. The target journal for this paper is *Health and Place*, an interdisciplinary journal that accepts articles up to 6000 words. Supplementary material related to this manuscript is included in the appendices of this thesis: Appendix A contains the information sheet and consent form and Appendix B contains the questionnaire used in the study.

Abstract

We examined the relationships between perceptions of neighbourhood characteristics and satisfaction with participation in everyday activities among 248 older adults with chronic health conditions in Hamilton, Ontario, Canada. We used a cross-sectional survey to collect data regarding neighbourhood characteristics, social support, social network size, and individual characteristics. Path analysis showed that fewer neighbourhood problems directly predict higher levels of satisfaction with participation. Neighbourhood cohesion indirectly predicts participation by predicting social support, which predicts participation. Neighbourhood safety indirectly predicts participation by predicting increased social cohesion and neighbourhood amenities may influence participation similarly. Given the significant relationship between neighborhood characteristics and participation, changes to these characteristics have the potential to facilitate participation in daily activities for older adults with chronic health conditions.

Key Words: Participation; activities of daily living; human activities; chronic disease; aged; aging; residence characteristics; social environment

Introduction

The ability to participate in daily occupations such as leisure, social and community activities is a major part of quality of life for older adults (Gabriel & Bowling, 2004; Howell & Cleary, 2007). Chronic health conditions such as heart diseases and arthritis are common among older adults, with estimates of 72% of older adults experiencing one or more chronic conditions (Health Council of Canada, 2010). This group often experiences difficulty participating in daily occupations (Perruccio, Power, & Badley, 2007), difficulties which stem from the interaction between personal characteristics and environmental characteristics (Law et al., 1996). Supports within the neighbourhood environment have the potential to facilitate participation for older adults with chronic conditions.

Participation is defined as involvement in a life situation (WHO, 2002) and includes activities such as caring for oneself, socializing with others, volunteer work or paid employment. Participation is not dependent upon physical or mental abilities, and reflects an individual's preferences and values (Law et al., 1996). In fact, despite some variation in symptoms between people with different chronic conditions, type of chronic condition does not predict participation (Cardol et al., 2002). Participation also reflects the environment in which participation takes place. Thus, a person with limited physical or mental abilities, in an environment with supportive characteristics, can achieve satisfactory participation (WHO, 2002).

Knowledge about the impact of neighbourhood factors on participation for older adults with chronic conditions is limited. Studies of older adults with and without chronic

conditions show that perceived availability of services such as stores, transportation, and health services in an area is linked to greater social participation (Bowling & Stafford, 2007; Haak et al., 2008; Richard et al., 2009). The built environment including good sidewalk condition, little litter, yard maintenance, and fewer window bars is related to more participation in community activities (King, 2008) and perceived social cohesion mediates some of these relationships (King). Fewer community mobility barriers are linked to lower limitation in participation (Keysor et al., 2010). Self-perceived neighbourhood safety is linked to lower frequency of out-of-home participation (Hovbrandt, Stahl, et al., 2007) and living in a neighbourhood in which people know and trust each other is related to increased social participation (Bowling & Stafford, 2007; Richard et al., 2009).

As outlined in Chapter 2 of this thesis, this literature contains several gaps. Previous studies typically addressed narrow aspects of participation such as frequency of performing community activities (Hovbrandt, Stahl, et al., 2007; King, 2008) and frequency of performing social activities (Bowling & Stafford, 2007; Richard et al., 2009). The current study focused on satisfaction with participation; although people vary in their preferences for the frequency of participation, satisfaction in activities is a common goal. The current study also measured participation in a range of social, community, and individual activities. In terms of environmental data, previous studies typically focused on perceptions of neighbourhoods, but did not consider social support, a major influence on participation (Neugebauer & Katz, 2004). One exception considered social support (Keysor, Jette, Coster, Bettger, & Haley, 2006) but examined limited

neighbourhood characteristics. The current study included social support and social network size in the analysis. The current study also investigated relationships between variables, such as the possible mediating role that social support and social network size play between neighbourhood factors and participation, in contrast to previous studies that did not examine relationships between variables.

The conceptual model developed for the study draws on previous literature and theory outlined in Chapter 2 in this thesis and includes perceptions of neighbourhood characteristics, social support, social network size and satisfaction with participation. Neighbourhood amenities, neighbourhood problems, neighbourhood safety, and neighbourhood cohesion were all expected to predict participation (Glass & Balfour, 2003) and social network size (Berkman et al., 2000). The four neighbourhood characteristics were expected to covary. Social network size was expected to predict social support (Berkman et al., 2000), which was in turn expected to predict participation (Fukukawa et al., 2004). Individual characteristics were subsequently added to the initial model and were expected to predict participation (Law et al., 1996). Specifically, physical functional status and depressive symptoms are closely linked to participation (Machado, Gignac, & Badley, 2008; Wilkie et al., 2007a) and need to be controlled for when examining neighbourhood effects on participation. In addition, participation in men and women and people of different ages may be influenced by different neighbourhood characteristics. For example, older people may require more social support than neighbourhood support to participate, compared to younger people. Women's

participation may be more influenced by neighbourhood amenities compared to men. Therefore the effects of gender and age were tested in the model.

The aim of the study was to examine the relationship between perceptions of neighbourhood characteristics on satisfaction with participation in everyday activities among 248 older adults with chronic health conditions. The specific objectives of the study were to (1) test a model regarding the relationships between perceptions of neighbourhood characteristics, the individual's social environment and satisfaction with participation in everyday activities and (2) test the applicability of the model to different genders and age groups.

Methods

Study Sample and Data Collection

The study employed a cross-sectional design using a self-administered, mailed survey. Participants were recruited from two large family health practices in Hamilton, Ontario. Patients in these practices are spread across the city and do not necessarily reside in the areas near the health centres. Health centre staff identified potential participants through searching electronic medical records and mailed invitation letters and questionnaires to eligible individuals. Centre staff also distributed questionnaire packages in person at one health centre. Participants returned completed questionnaires directly to the researchers. One reminder postcard was sent to individuals who had not returned the questionnaire after 3-4 weeks. The study was approved by the McMaster University/Hamilton Health Sciences Research Ethics Board.

The sample included adults age 60 years or more living in the community in Hamilton, Ontario, with one or more of arthritis (osteoarthritis (OA) or rheumatoid arthritis (RA)), diabetes, chronic obstructive pulmonary disease (COPD) or heart disease. These diagnoses were selected because they are the most prevalent chronic conditions for people age 65 or more (Gilmour & Park, 2006) that have a large impact on health care use or quality of life (Health Council of Canada, 2007). Potential participants were excluded if they used translator services for health centre appointments, had a diagnosis suggesting significant cognitive problems (e.g. dementia) or lived in a supportive housing environment such as a nursing home. In addition, only one person per household was invited to participate, selected at random.

Six hundred and eighty-one (681) questionnaire packages were distributed to potential participants (662 by mail and 19 in-clinic). Of these, 67 individuals were ineligible to participate for the following reasons: packages were returned undelivered (19 people), moved outside of Hamilton (2), resided in a supportive environment (6), health centre staff reported the person did not have one of the target chronic conditions or had a cognitive impairment (39), and returned the questionnaire after data collection had finished (1). Therefore, 614 people were eligible to participate in the study; 248 individuals returned a questionnaire. The response rate was 40%.

Measurement

Participation.

Participation can be defined in terms of several dimensions, including limitation, frequency, importance or satisfaction (Law, 2002). In this study, participation was

considered to be satisfaction with participation and was measured using the Keele Assessment of Participation (Wilkie et al., 2005). The scale measures satisfaction with participation in 11 life areas such as self-care, mobility, work or social activities. The scale takes into account individual characteristics and abilities and environmental supports and barriers. Questions are phrased, for example, ‘During the past 4 weeks, my home has been looked after, as and when I have wanted’ and response options range from 1 (‘None of the time’) to 5 (‘All of the time’). Four questions screen for applicability to the person. Questions that do not apply are not included in the scoring. The total score is the mean of the relevant items’ scores. Responses to the scale have good test-retest agreement (68-83%), evidence of convergent validity and low respondent burden among older adults (Wilkie et al., 2005).

Neighbourhood characteristics.

Four neighbourhood variables were measured: neighbourhood amenities, problems, cohesion and safety. Neighbourhood amenities were assessed using the Access to Services scale of the Neighbourhood Environment Walkability Survey Abbreviated version (NEWS-A) (Cerin, Saelens, Sallis, & Frank, 2006). This scale contains three questions that address walking access to stores, other destinations, and transit stops and is scored on a four-point scale from 1 (‘strongly agree’) to 4 (‘strongly disagree’). The total score is the mean of the three items. The scale items show good test-retest reliability, with intraclass correlations ranging from 0.53-0.80 (Brownson et al., 2004; Saelens, Sallis, Black, & Chen, 2003). There is also evidence of construct validity, as the original NEWS

access to services subscale was able to discriminate between high and low walkable neighbourhoods (Leslie et al., 2005; Saelens et al., 2003).

Neighbourhood problems were assessed using six questions about traffic, noise, crime, air quality, litter/ garbage, and graffiti (Bowling, Barber, Morris & Ebrahim, 2006). Items are scored on a six point scale ranging from 0 ('no problem') to 6 ('very big problem'). The total score is the mean of the six items. The neighbourhood problems included in the scale are similar to those identified by a Hamilton sample in response to open-ended questions of neighbourhood problems (Wilson et al., 2004).

Neighbourhood safety was assessed by a two-item scale addressing safety at night and during the day (Young, Russell, & Powers, 2004). Neighbourhood cohesion was assessed by a seven-item scale that includes questions related to trust and reciprocity among neighbours (Young et al., 2004). Response options for both scales range from 1 ('strongly agree') to 5 ('strongly disagree'). The total scores are the means of the scale items. The two scales measure distinct concepts among adults and older women, shown through two factor analyses (Turrell, Kavanagh, & Subramanian, 2006; Young et al., 2004). Construct validity was also demonstrated in that neighbourhood cohesion increases as years lived in the community increases and safety increases as area of residence moves from urban to rural to remote (Young et al., 2004).

Social environment.

Social support and social network size were measured with the Medical Outcomes Study Social Support Survey (Sherbourne & Stewart, 1991). Nineteen items measure social support. Respondents state how often various types of support are available, from

five options ranging from “None of the time” (1) to “All of the time” (5). Social support item scores are added to form subscales and the mean of the subscale scores forms the total score, rescaled to 0-100. Only the total score was used in this analysis. One further question assesses social network size by asking about the person’s number of close friends and relatives. The Social Support Survey has high internal consistency (0.97) and one-year test-retest reliability (0.78) (Sherbourne & Stewart). Convergent validity testing showed that responses correlate moderately with loneliness, mental health, and family functioning. Discriminant validity testing showed that responses correlate at a low level with physical symptoms, role limitations and pain severity (Sherbourne & Stewart).

Individual characteristics.

Depressive symptoms were assessed using the Centre for Epidemiologic Studies Depression Scale – short version (CESD10) (Andresen, Malmgren, Carter, & Patrick, 1994). The scale includes 10 items that measure frequency in the past week of experiences such as hope, restless sleep or happiness. Response options range 0 (‘none of the time’) to 3 (‘most of the time’). The total score is generated by summing the item scores (Radloff, 1977). The CESD10 has good test-retest reliability ($r=.71$) and agreement for presence of depression between the original CESD and the CESD10 is good (Kappa=.97) (Andresen et al., 1994). The original CESD has sensitivity of 100% and specificity of 88% for detecting major depression (Beekman, Deeg, Van Limbeek, Braam, De Vries, & Van Tilburg, 1997) and correlates moderately to strongly ($r=.51-.72$) with measures of psychological distress (Radloff, 1977).

Physical function was assessed using the Medical Outcomes Study 10-item Physical Function scale (PF10) (McHorney, Ware, Rogers, Raczek, & Lu, 1992). Items assess limitation in performing physical tasks due to health problems such as vigorous activities, lifting/carrying, climbing stairs, walking and bathing/dressing. Response options range from 1 ('limited a lot') to 3 ('not limited at all'). The raw score is the sum of the item scores and is converted to a standardized score ranging from 0-100. The PF10 has shown good test-retest reliability ($r=0.81$) (Brazier et al., 1992) and it discriminates between people with minor or serious chronic medical conditions (McHorney et al., 1992).

Socio-demographic information collected included household income, education, age, gender, and presence of 17 chronic conditions (Statistics Canada, 2003).

Ten older adults pilot-tested the questionnaire and commented on question clarity, comfort level in answering questions, and any changes needed. They reported the questions were clear and easy to answer and suggested only minor spelling and formatting changes.

Data Analysis

Descriptive statistics and missing data analysis were completed using the Statistical Program for the Social Sciences (SPSS) version 18. The data were then analyzed with path analysis using Mplus version 5.21. Path analysis is an appropriate technique for this study due to its ability to test conceptual models (Raykov & Marcoulides, 2006). The covariance matrix generated from individual data was analyzed and maximum likelihood estimation was used to estimate parameters. To minimize

differences in the variables' variances and avoid failure of iterative estimation, the social support scale, CESD10 and PF10 were rescaled to a 0-5 scale as recommended by Kline (2005). The social support scale scores were divided by 20, the CESD10 scores were divided by 6, and the PF10 standard scores were divided by 20 (Kline). Analysis occurred in two stages. Stage 1 involved a model with neighbourhood, social environment and participation variables as described in the conceptual model above. Analysis involved the following steps: estimate the model; examine indices of model fit and the correlation matrix; adjust the model as suggested by the analysis and in congruence with theory; re-examine indices of model fit and the modification index and adjust as needed. Stage 2 built upon Stage 1 by adding physical function and depressive symptoms to the model based on theory and the correlation matrix. Stage 2 analysis involved estimating the model, examining indices of model fit and the modification index and adjusting as needed. Fit of the Stage 2 model to age and gender subgroups was tested using the Chi-squared difference test. One path coefficient at a time was free to vary between groups, while the remaining parameters were constrained to be equal between groups.

A sample size of 248 individuals was adequate for the path analysis. The ratio of participants to unknown parameters should be at least 5:1 (Kline, 2005) and up to 10:1 as a cautious estimate (Raykov & Marcoulides, 2006). The unknown parameters in a path analysis model are: the variances of the exogenous (independent) variables, the variances of the disturbances for endogenous (dependent) variables, the path coefficients and the covariances between variables (Kline, 2005). The model in stage 2 had 31 unknown

parameters, leading to a ratio of 8:1 participants to parameters. The subgroup analysis contained 41 unknown parameters, leading to a ratio of 6:1 participants to parameters.

The participation and social support data demonstrated ceiling effects, violating the assumption in path analysis that dependent variables are normally distributed (Kline, 2005). An alternative method of analysis to cope with this issue involved designating these variables as censored. Analyzing the initial model in this way produced parameter estimates that were very similar to analysis without censoring (standardized differences of approximately 0.02). Considering that maximum likelihood estimation can give reliable estimates of path coefficients for non-normal data but fit indices may be slightly inflated (Kline, 2005), no changes were made to the analysis plan.

Missing data were handled through two methods. If 20% or less of a given scale was missing, then the mean score across participants was imputed for the missing items, an acceptable method for small amounts of missing data (Brick & Kalton, 1996). Scales that had enough items (5 or more) to qualify for imputation were: neighbourhood cohesion, neighbourhood problems, participation, physical function, depressive symptoms, and social support. If greater than 20% of a scale's items were missing, then the remaining scale data was discarded. Variables with missing values were then handled by estimation of the covariance matrix and means during path analysis using full information maximum likelihood estimation (Kline, 2005). This type of estimation requires the assumption that the missing data is missing at random (Kline, 2005).

Approximately 80% of participants answered all questionnaire items. Aside from demographic questions, approximately 86% of participants answered all items. Each item

had up to 4% missing, with the exception of the income item which 12.5% of participants left blank. The most common missing data patterns had 1-2 items missing per person. This pattern of a low proportion of missingness on each item and a high proportion of participants that answered all questions suggests the missing at random assumption is valid. Imputations were made on 40 scales and included 51 individual items within scales. After imputation, the total scores for these 40 scales were calculated as usual and were included in the subsequent path analysis. Data from a further 20 scales across all participants that had greater than 20% of items missing was discarded. Values for these variables were estimated during path analysis using the maximum likelihood method.

Results

The sample included slightly more women than men and ranged in age from 60-94 years. The participants had an average of 1.8 of the four target chronic conditions (arthritis, diabetes, COPD or heart condition; standard deviation=0.9) and 90% of the sample had 2 or more of the 17 chronic conditions assessed. Roughly half of the participants had completed high school in education and had a yearly household income of less than \$40,000 (see table 1). In general, participants reported high satisfaction with participation. Sixty-three participants (25%) reported the maximum score for participation. Participants also reported high levels of social support, good neighbourhood cohesion and safety, low numbers of neighbourhood problems, and good access to services. The neighbourhood amenities, cohesion and safety scales are scored such that higher scores indicate lower levels of each concept. Table 2 contains descriptive information about the individual and neighbourhood variables.

Stage 1 – Neighbourhood and Social Variables

The data showed poor fit to the theory-based conceptual model. The Chi-squared value was quite high (31.9, $df=5$) and the root mean square error of approximation (RMSEA) suggested poor fit (.147, 95% confidence interval = .10 - .20). Examining the correlation matrix (Table 3) suggested that there is a direct link between neighbourhood cohesion and social support ($r=0.382$) and previous research has shown that neighbourhood cohesion can mediate the relationship between neighbourhood problems and participation (King, 2008). Therefore Model 1 was hypothesized as shown in Figure 1. The fit indices suggest that the data fit this model well, with a Chi-squared value of 2 (4 degrees of freedom) and an RMSEA of 0.0. See Table 4 for details. The modification index did not suggest any further changes to the model.

The model shows that neighbourhood problems are directly related to participation. A lower neighbourhood problems score leads to greater satisfaction with participation ($r=-0.19$). Two indirect pathways linked neighbourhood characteristics and participation. Neighbourhood amenities, safety and cohesion scales are scored such that lower scores indicate greater presence of these characteristics. Neighbourhood amenities and neighbourhood safety both predict satisfaction with participation through neighbourhood cohesion and social support. Social support is also an important predictor of satisfaction with participation ($r=0.39$). Model 1 explains 26.5% of the variance in participation.

Stage 2 – Neighbourhood, Social and Individual Variables

Depressive symptoms and physical function were added to Model 1 and were expected to directly influence satisfaction with participation. Depressive symptoms were also expected to covary with physical function and with social support. The correlation matrix suggested that there is also a relationship between social support and physical function. The influence of physical function on satisfaction with participation may be mediated by social support, so Model 2 included this relationship (Figure 2). The fit indices suggest that the data fit this model well, with a Chi-squared value of 18.9 (8 degrees of freedom) and an RMSEA of 0.7 (see table 4 for details). A model (not shown) that did not include any relationship between physical function and social support had a Chi-squared value of 39.4 (9 degrees of freedom), supporting the idea that social support mediates the relationship between physical function and participation. The modification index and existing literature did not suggest a clear way to improve Model 2, so it was accepted as the final model.

Model 2 shows that higher physical function ($r=0.37$) and lower depressive symptoms ($r=-0.20$) predict higher satisfaction with participation and that neighbourhood characteristics and social network size continue to predict satisfaction with participation as in Model 1. In Model 2, the influence of social support on satisfaction with participation decreased from 0.39 to 0.18. The standardized coefficients in Figure 2 show that individual characteristics have a greater influence on satisfaction with participation than neighbourhood characteristics or social support.

Table 5 summarizes the standardized direct, indirect, and total effects of each variable on satisfaction with participation. The total standardized effects on participation of physical function, depressive symptoms, social support and neighbourhood problems are similar to the direct effects noted in Figure 2. Among the variables with only indirect effects on participation, higher neighbourhood safety, cohesion and larger social network size have small, significant indirect effects on participation. The indirect effect of neighbourhood amenities on participation did not reach statistical significance. Model 2 explains 43.5% of the variance in satisfaction with participation.

Fit of Model 2 to Sub-groups

In comparing men and women (n=248), model fit was significantly improved when the relationship between neighbourhood problems and satisfaction with participation was free to vary between groups (chi-square difference=4.1, 1 degree of freedom change). In this case, neighbourhood problems were not associated with participation for men, while the standardized parameter for women increased to -0.22 (p=0.00), compared to the single-group model coefficient of -.15. In all other respects, Model 2 fits both genders equally well.

To compare different age groups (n=247), the sample was split into two groups: 60-72 years and 73+ years (the mean and median ages were both 73 years). Model fit was significantly improved when the correlation between social support and depressive symptoms was allowed to vary between groups (chi-square difference=4.5, 1 degree of freedom change). For the participants aged 60-72 years, the standardized parameter

decreased from -0.32 to -0.38 ($p=0.00$). For the participants aged 73 years or more, the standardized parameter increased from -0.32 to -0.26 ($p=0.00$). Model fit was also improved when the correlation between neighbourhood safety and problems was free to vary between groups (chi-square difference=5.3, 1 degree of freedom change). For the younger age group, the standardized parameter increased from 0.53 to 0.58 ($p=0.00$) and for the older age group the standardized parameter decreased from 0.53 to 0.49 ($p=0.00$). In all other respects, Model 2 fits both age groups equally well.

Discussion

The study results indicate that neighbourhood characteristics are related to satisfaction with participation when accounting for the effects of the social environment (social support and network size) and individual limitations (physical function and depressive symptoms). Specifically, fewer neighbourhood problems directly predict higher levels of participation. Good neighbourhood safety and cohesion indirectly predict higher levels of participation to a small degree. The indirect effect of neighbourhood amenities on participation did not reach statistical significance. The strongest direct predictor of satisfaction with participation was physical function, followed by depressive symptoms, social support, and neighbourhood problems. Among the variables with only indirect effects, greater neighbourhood safety, cohesion and larger social network size have similar, small effects on satisfaction with participation. The final model fit age and gender subgroups well, with minor differences in the model between groups.

Previous studies have identified that a range of neighbourhood characteristics are related to frequency of or limitation in overall, community or social participation. The current study adds to this evidence by showing that a range of neighbourhood characteristics are related to another domain of participation, that is, satisfaction with participation. A previous study examined satisfaction with participation, but the only neighbourhood characteristic measured was access to public transportation (Wilkie, Peat, Thomas & Croft, 2007b). In addition, the current study controlled for the influence of social support on participation, in contrast to most studies in this area, and therefore provides stronger support regarding the relationship between neighbourhood characteristics on participation. Finally, this study identified potential pathways through which neighbourhood characteristics may influence participation. Neighbourhood amenities and neighbourhood safety predict neighbourhood cohesion, which in turn predicts social support, which predicts satisfaction with participation.

The finding that neighbourhood problems such as traffic, noise, graffiti and litter directly predict participation supports a study by King (2008) that found that litter, yard maintenance, and window bars are linked to frequency of participation in community activities. The current study also found that neighbourhood problems decrease satisfaction with participation independent of neighbourhood cohesion. This is in contrast to King who found that perceived social cohesion mediates the relationship between objectively measured neighbourhood problems and frequency of participation. The neighbourhood problems identified by King included yard maintenance, window bars, and litter, and these were each analyzed separately for their influence on participation. In

the current study, problems were grouped into a scale that included issues such as traffic, noise, crime, air quality and graffiti. These issues may have a smaller impact on social cohesion than yard maintenance or window bars and may explain the difference in findings.

The findings show that presence of stores and other places in the neighbourhood and a sense of safety in the neighbourhood predict a sense of social cohesion. This social cohesion may create opportunities for social support, which in turn predicts satisfaction with participation in daily activities. Greater level of social support is also predicted by larger social network size. These findings fit with previous research that showed that frequency of social participation is related to perceived availability of amenities (Bowling & Stafford, 2007; Haak et al., 2008; Richard et al., 2009), perceived neighbourhood safety (Freedman et al., 2008; Hovbrandt, Stahl, et al., 2007), and perceived neighbourhood cohesion (Bowling & Stafford, 2007; King, 2008, Richard et al., 2009). These studies did not, however, examine social support as a mediator of these relationships.

Contrary to predictions, neighbourhood safety and amenities did not appear to relate to social network size, although neighbourhood cohesion did relate to social network size. One possible explanation is that neighbourhood characteristics may influence aspects of social networks other than size, such as interconnections within a group. Another explanation could be that social network size can be influenced by many factors external to neighbourhoods, such as involvement in workplaces, community

groups, or number of children. Neighbourhood characteristics may therefore play a relatively minor role in social network size.

All variables in the models have significant relationships with at least one other variable. Model 1, containing neighbourhood and social factors, explained a relatively high proportion of the variance in satisfaction with participation (26.5%). Adding personal factors to the model explained 43.5% of the variance in satisfaction with participation. The high proportion of variance that Model 2 explained was somewhat surprising, given the complexity of participation.

Gender and age did not appear to influence model fit substantially. Satisfaction with participation among men was not predicted by neighbourhood problems, whereas the reverse was true for women. Women may notice neighbourhood issues such as traffic, noise, crime and litter more than men and therefore restrict their participation within their neighbourhoods. The relationship between social support and depressive symptoms was stronger for the younger age group, suggesting that as people age, factors aside from depression such as proximity of children may be more related to social support. Given the small difference between age groups, this hypothesis requires further testing.

Strengths and Limitations

The strengths of this study include assessment of environmental as well as personal determinants of participation, use of path analysis, and a relatively good response rate. One limitation includes the lack of detail about neighbourhood amenities. Information about specific amenities in an area that may affect participation could be useful, as in one qualitative study that found that benches are important in supporting

participation for older adults (Hovbrandt, Fridlund, et al., 2007). In addition, social networks were measured in terms of size only, and did not include other aspects such as intimacy or frequency of contact (Berkman et al., 2000). For that reason social network may have been a less major part of the model. In addition, the generalizability of the results may be limited because the sample included participants with relatively high satisfaction with participation, a finding that has been reported in similar studies (Wilkie et al., 2005). It is likely that people with lower participation levels were eligible for the study yet declined to take part for various reasons. Looking at demographic characteristics, the current study's sample had lower education and higher income compared to Hamilton and Canada. In the current study, 26% of participants had achieved a post-secondary trade, degree or certificate, whereas 37% of people age 65 or more in Hamilton had achieved this level of education (Statistics Canada, 2006a). The proportion is similar across Canada (Statistics Canada, 2006a). The median income of participants in the current study was \$30,000-\$39,000 whereas the median income of people age 65 or more in Hamilton was \$22,856 and in Canada was \$20,429 in 2005 (Statistics Canada, 2006b). These statistics suggest that the current study's sample is somewhat different from the Hamilton and Canadian population. One further limitation is that the neighbourhood, participation and social support scales skew toward the positive end of the scales. This limited variability of responses can bias path coefficients toward zero, thus underestimating the impact of the independent variables upon participation.

Implications

Because this study focused on the individual's satisfaction with engagement in daily activities, the results shed light on potential ways to improve daily life for older adults with chronic conditions. Neighbourhood changes could include removing or decreasing litter, traffic, and graffiti. Public health and health care professionals could implement programs to increase neighbourhood cohesion, such as drop-in centres. Policy changes could be made to increase the presence of amenities in a neighbourhood. Health care professionals can also encourage their clients to consider moving to neighbourhoods that would better support their satisfaction with participation, while also considering the stress and dislocation of moving to a new place. This study also highlights the fact that individual abilities have the greatest impact on satisfaction with participation and that health professionals can continue to address individuals' limitations. It seems clear, however, that a focus on both individual and environmental factors is needed to optimize satisfaction with participation for older adults with chronic conditions.

Future research in this area could include determining the specific neighbourhood amenities that may influence satisfaction with participation, whether perceptions are congruent with objective measures of neighbourhood characteristics, and confirmation of the models described here. Next steps could include longitudinal research to examine causality and participatory research to create neighbourhood change.

Conclusion

This study explored the neighbourhood predictors of participation in a new way by examining the domain satisfaction with participation, considering neighbourhood

characteristics, social support and personal characteristics together, and investigating possible pathways to participation. The results indicate that increased neighbourhood safety and cohesion and decreased neighbourhood problems each independently predict satisfaction with participation. Social cohesion and social support mediate the relationship between neighbourhood safety and participation. Individual characteristics were the strongest predictors of satisfaction with participation, followed by social support then neighbourhood characteristics. The results apply to men and women and younger and older age groups. Modifying neighbourhood conditions to better meet personal needs may help to facilitate satisfaction with participation for older adults with chronic conditions.

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Table 1

Participant Characteristics	
Age (mean, standard deviation)	73 (7.6)
Number of chronic diseases (mean, standard deviation)	3.7 (1.8)
Gender	Frequency (%)
Men	104 (41.9)
Women	144 (58.1)
Highest Education Attained	Frequency (%)
Elementary/some highschool	68 (27.4)
Highschool	54 (21.8)
Some college/university/trade	54 (21.8)
Trade school/college	40 (16.2)
University	26 (10.5)
No answer	6 (2.4)
Yearly Household Income (Canadian dollars)	Frequency (%)
Less than \$20,000	52 (21.0)
\$20,000 to \$39,000	76 (30.6)
\$40,000 to \$59,000	50 (20.2)
\$60,000 to \$79,000	18 (7.3)
\$80,000+	21 (8.5)
No answer	31 (12.5)

Table 2

Neighbourhood and Individual Variable Scores				
Variable	N	Mean (SD)	Median	Possible Range
Individual variables:				
Participation ^a	247	4.3 (0.7)	4.5	1-5
Physical function ^a	248	20.7 (5.6)	21.0	10-30
Depressive symptoms ^b	243	8.1 (5.4)	7.0	0-30
Social support ^a	245	74.1 (25.2)	80.3	0-100
Close friends/family ^a	242	9.4 (12.6)	6.0	
Neighbourhood variables^b:				
Cohesion	244	2.3 (0.7)	2.1	1-5
Safety	246	2.1 (0.9)	2.0	1-5
Problems	245	1.5 (1.4)	1.2	0-6
Amenities	246	1.8 (0.7)	1.7	1-4

^a Higher scores are better.

^b Lower scores are better.

Table 3

Significant ($p \leq 0.05$) Correlations between Variables

	Participation	Social Support	Social Network Size	Cohesion	Safety	Problems	Services	Depression
Social Support	0.45							
Social network size	0.17	0.30						
Cohesion	-0.27	-0.38	-0.22					
Safety	-0.29	-0.18		0.43				
Problems	-0.31	-0.17		0.30	0.53			
Amenities				0.27				
Depressive symptoms	-0.49	-0.48	-0.17	0.24	0.28	0.32		
Physical function	0.53	0.31	0.18		-0.20	-0.13	-0.16	-0.36

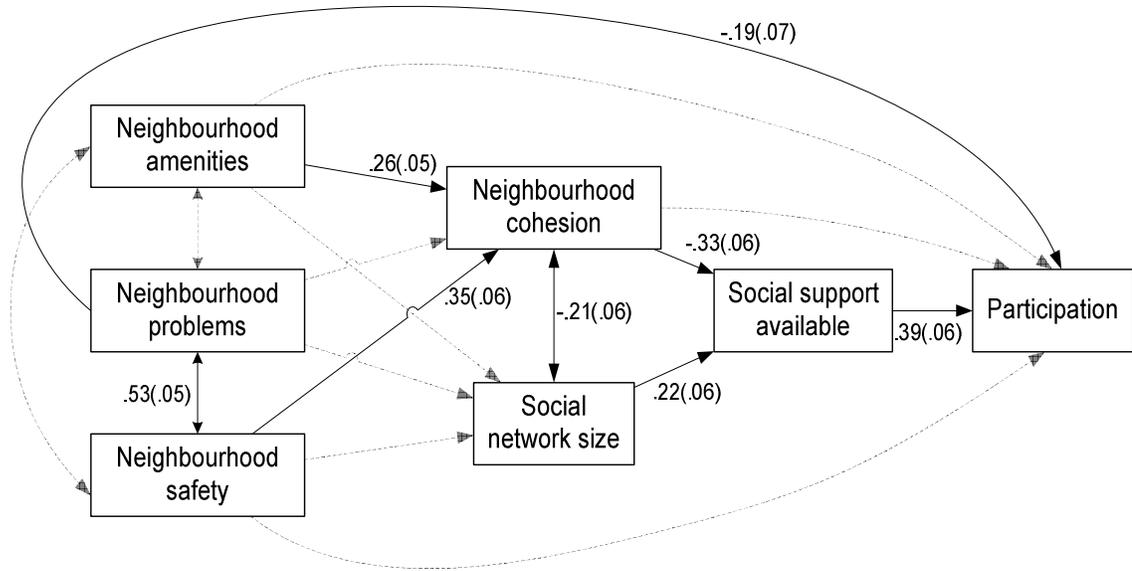
Note: Correlations are based on data in which maximum likelihood estimation was used to estimate missing data.

Table 4

Models 1 & 2 Fit Indices			
Fit Index ^a	Criteria	Model 1	Model 2
Chi ²	Minimize	2.0 (df=4)	18.9 (df=8)
CFI	>.9= good fit	1.0	.97
RMSEA (90%CI)	<.05=close fit >.1=poor fit	0.0 (0.0 - 0.07)	0.07 (.03-.12)
R ² participation	Maximize	.265	.435

^aChi²= Chi-squared test of model fit, CFI=comparative fit index, RMSEA=root mean square error of approximation, R²=variance accounted for by model.

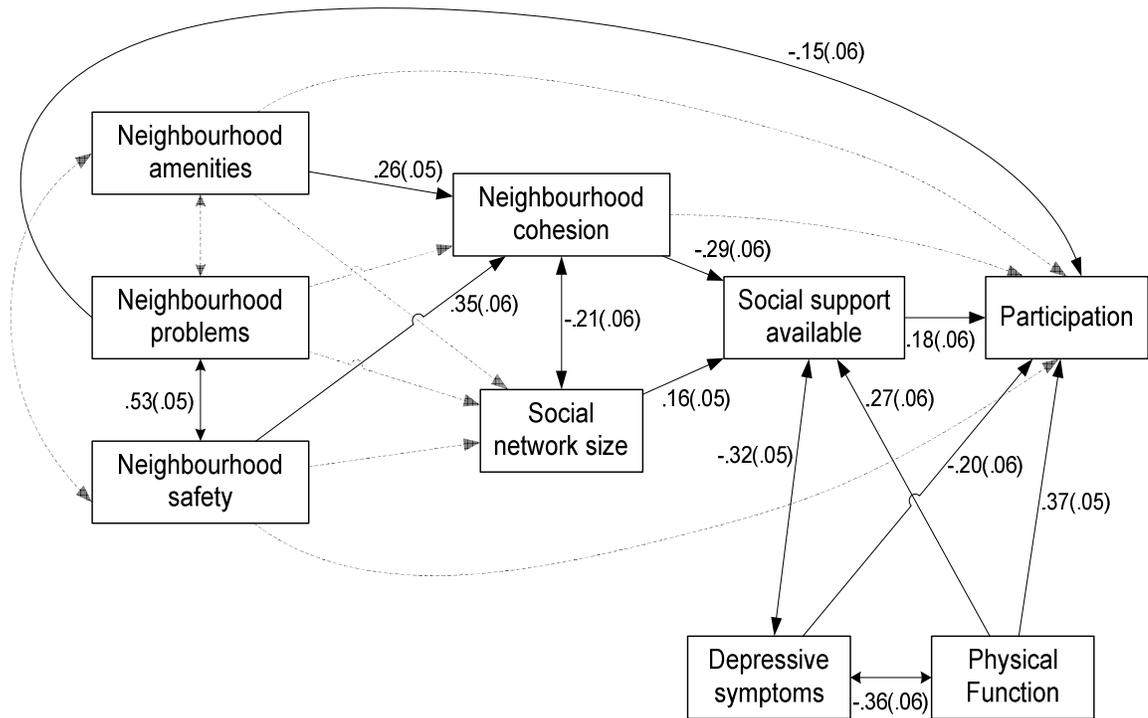
Figure 1. Model 1



Note: Standardized parameters (standard error) are presented. Solid lines represent relationships significant at $p \leq .05$; dashed lines represent non-significant relationships.

Lower neighbourhood amenities, safety and cohesion scores indicate greater presence of these characteristics.

Figure 2. Model 2



Note: Standardized parameters (standard error) are presented. Solid lines represent relationships significant at $p \leq .05$; dashed lines represent non-significant relationships.

Lower neighbourhood amenities, safety and cohesion scores indicate greater presence of these characteristics.

Table 5

Standardized Direct, Indirect, and Total Effects of each Variable on Participation in Model 2

Variable	Direct effect	Indirect effect	Total effect
Neighbourhood cohesion	-0.06	-0.05*	-0.11 ^a
Neighbourhood safety	-0.02	-0.04*	-0.06
Neighbourhood problems	-0.15*	-0.01	-0.16*
Neighbourhood amenities	-0.03	-0.03 ^a	-0.06
Social support	0.18*	0.00	0.18*
Social network size	NA	0.03*	0.03*
Depressive symptoms	-0.20*	0.00	-0.20*
Physical function	0.37*	0.05*	0.42*

NA: path not specified in model; * $p < .05$; a: $.05 < p < .1$

**CHAPTER 4: An Examination of Social Support Influences on Participation for
Older Adults with Chronic Health Conditions**

Preface

This chapter contains a manuscript entitled “An Examination of Social Support Influences on Participation for Older Adults with Chronic Health Conditions”. The authors are: C. Hand, M. Law, M. A. McColl, S. Hanna, and S. Elliott. My contribution to the paper was to develop the research proposal, perform data collection and analysis, and write the paper. The co-authors contributed to each of these aspects of the paper. The paper reports on the same data as the paper in Chapter 3. The analysis and writing was completed from January to April 2011. The target journal for this paper is Disability and Rehabilitation. This journal accepts articles up to about 6000 words.

Abstract

Social support can improve participation in everyday activities among older adults with chronic health conditions, but the specific types of support that are needed are unclear. Purpose: This study examined the types of social support that most strongly predict participation in everyday activities and examined whether presence of a spouse or partner and number of close friends predict social support. Method: Two hundred and twenty-seven (227) participants completed a cross-sectional survey. The sample included adults age 60 or more years with arthritis, diabetes, chronic obstructive pulmonary disease, and/or heart disease. Participation was defined as satisfaction with participation in 11 life areas. Social support was defined as availability of tangible, affectionate, emotional/informational and positive social interaction support. Results: Multiple regression analyses showed that participants who perceived greater tangible support and positive social interaction support had higher satisfaction with participation than participants with lower levels of these types of support. Presence of a spouse/partner and number of close friends and relatives predicted social support. Conclusions: Both tangible and social interaction support can be considered in efforts to facilitate satisfaction with participation for older adults with chronic conditions. Policy and programs can be implemented to build social networks for and provide more assistance to this population.

Keywords: Participation, daily activities, chronic disease, older adults, social support, social environment

Introduction

Chronic health conditions affect many areas of health and quality of life. Presence of chronic conditions increases health care use [1] and accounts for 60% of deaths worldwide [2]. Older adults with chronic health conditions also have difficulty participating in everyday activities [3],[4], affecting their quality of life and ability to contribute to their communities. Social support can improve participation in everyday activities among older adults with chronic health conditions [5] but the specific types of support that are needed are unclear. Identifying the types of social support that impact participation can provide information for program planning and policies regarding participation.

Social Support

Social supports are resources that an individual receives from other people and can be categorized as emotional (usually given by confidant or intimate person), instrumental (e.g. help with meals or errands), appraisal (help in decision making), and informational (advice and needed information) [6]. Another method of categorizing social support has been suggested by Sherbourne & Stewart [7] that includes tangible (same as instrumental), affectionate (providing affection), emotional/informational and positive social interaction support (having others for companionship). Berkman and colleagues' [6] conceptual model of social networks and health states that social networks lead to social support, which in turn leads to better health. Social networks are composed of different types of people such as a confidante, close friends and close family [8].

Cohen and Wills [9] suggested two related theories that could explain the relationship between social relationships and health: the main effect model and the stress-buffering model. The stress-buffering model posits that social support influences health by decreasing the detrimental effects of stressors on health, while the main effect model suggests that social support influences health directly. This study will test the main effects of four types of social support on participation.

Participation

The International Classification of Functioning, Disability and Health (ICF) defines participation as engaging in a life situation, such as caring for oneself, home maintenance, caring for others, work, volunteering, or social activities [10]. Participation in social, economic, cultural, spiritual and civic affairs is considered a key part of healthy and active ageing [10]. Within the ICF, participation is influenced by an individual's health condition(s), personal characteristics, and environment, which includes social support and relationships with others. There is no consensus about the operational definition of participation. Researchers commonly measure participation in terms of limitation [11], frequency [12], and satisfaction [13]. Further dimensions include importance, variety of activities, and where and with whom participation occurs [14].

Research regarding social support and participation tends to focus on overall social support or tangible/instrumental social support. This focus is in contrast to studies of social support and other aspects of health, such as depression, that have examined several types of social support together (e.g., [15]). Several studies have demonstrated significant links between higher levels of overall social support and participation in older

adults with chronic conditions. Higher perceived social support is associated more self-care behaviour in older adults with arthritis [16]. Low perceived adequacy of support is related to subsequent ADL impairment in older adults who underwent heart surgery [17]. High perceived adequacy of social support can protect against limitations in ADL in people with depression [18]. Social support can also mediate the relationship between health problems and participation [19]. In addition, large social networks are associated with social participation among older adults with chronic conditions [20] possibly due to the increased social support that large social networks provide.

Research regarding tangible/instrumental social support and participation has shown that availability of instrumental family support predicts participation in people with rheumatoid arthritis [5] and instrumental and quality of social support predicts community participation among people with stroke [21].

Many of these studies examined ADL participation, while other studies have examined more social forms of participation. For example, one study showed that higher perceived social support is associated with volunteering at a senior centre [22]. These findings highlight one of the difficulties in studying social support; the direction of effects is unclear. Social support may encourage participation, and conversely, participation may provide social support. Theories such as Berkman and colleagues' model [6] described above can help to interpret the direction of effects.

More research regarding the types of support that impact participation among older adults with chronic diseases is needed. Determining the types of support that are the strongest predictors of participation can identify areas in which social support

interventions may be most effective in improving participation, and conversely, areas in which interventions may not be needed.

The aim of this study was to examine the types of social support that most strongly predict satisfaction with participation in everyday activities and to examine predictors of social support for older adults with chronic conditions. The research questions were: What types of social support are most related to satisfaction with participation in older adults with chronic conditions? Does presence of a spouse or partner and number of close friends predict social support?

Methods

Participants and Procedure

The study involved a cross-sectional survey that took place from January to May 2010. Participants were registered at one of two large family health practices in Hamilton, Ontario, Canada. Patients were eligible for the study if their medical record showed that they had one or more of arthritis, diabetes, chronic obstructive pulmonary disorder, or heart disease and were 60 or more years of age. Questionnaire packages and one reminder postcard were distributed to 681 potential participants. Participants then returned the self-completed survey. Potential participants were subsequently excluded if they had moved outside of Hamilton (2 people), they resided in a nursing home/other supportive environment (6), their package was returned undelivered (19), they were identified by health centre staff as not having one of the target chronic conditions or having a cognitive impairment (39) or they returned the questionnaire after data collection had finished (1). Thus 614 individuals were eligible to participate. Completed questionnaires were

received from 248 individuals for a response rate of 40%. Ethical approval for the study was given by the McMaster University Research Ethics Board.

Measures

Social support.

Social support was measured with the Medical Outcomes Study Social Support Survey [7]. Nineteen items measure four categories of social support: tangible support, emotional or informational support, affectionate support, and positive social interaction support. Respondents state how often various types of support are available, from five options ranging from “None of the time” (1) to “All of the time” (5). Subscale scores are the sum of subscale items, rescaled to 0-100. Sample items for each type of support include ‘Someone to help you if you were confined to bed’ (tangible support), ‘Someone to give you good advice about a crisis’ (emotional/informational support), ‘Someone who shows you love and affection’ (affectionate support), and ‘Someone to have a good time with’ (positive social interaction support). The Social Support Survey was designed for use with individuals with chronic illness and has high internal consistency overall and within subscales (alphas range from .91- .97) [7]. Test-retest reliability over one year range from 0.72-0.78 overall and for the subscales. Evidence of convergent validity shows that responses correlate moderately with loneliness, mental health, and family functioning. Evidence of discriminant validity shows low correlations with physical symptoms, role limitations and pain severity ($r=-0.14-$ to -0.30) [7].

One item on the Social Support Survey was used to assess the number of close friends and relatives reported by an individual [7]. Marital status was assessed by the question ‘Do you have a spouse or partner?’

Participation.

Participation was operationalized as satisfaction with participation and was measured using the Keele Assessment of Participation [13]. The scale is based on the domains of the International Classification of Function, Disability and Health [23] and includes 11 questions about life areas such as self-care, mobility, work or social activities. Sample questions include ‘During the past 4 weeks, my home has been looked after, as and when I have wanted’ and ‘During the past 4 weeks, have you taken part in social activities, as and when you have wanted?’ Response options range from 1 (‘None of the time’) to 5 (‘All of the time’). Four questions also include a screening question about whether the person chooses to take part in the activity. Questions that do not apply are not included in the scoring. The total score is the mean of the relevant items’ scores. Among adults 50 years and over, responses to the scale have good test-retest agreement (68-83%), evidence of convergent validity and low respondent burden [13].

Individual characteristics.

Individual characteristics that could be confounders in the relationship between social support and participation or are strong predictors of participation were assessed. These include age, gender, number of chronic conditions, depressive symptoms and physical function. Number of chronic conditions was assessed using a list of 17 common conditions [24]. Depressive symptoms were assessed using the Centre for Epidemiologic

Studies Depression Scale – short version (CESD10) [25]. Ten items assess experiences such as depression, restless sleep or happiness. Questions ask about the frequency of each experience in the past week and response options range 0 ('none of the time') to 3 ('most of the time'). The total score is generated by summing the item scores [26]. The CESD10 has adequate test-retest reliability ($r=.71$) and shows good agreement with the original CESD for presence of depression ($\text{Kappa}=.97$) [25]. The original CESD has sensitivity of 100% and specificity of 88% for detecting major depression [27]. It also shows evidence of convergent validity, in that it correlates moderately to strongly ($r=.51-.72$) with measures of psychological distress [26]. Physical function was measured using the Medical Outcomes Study Physical Function scale (PF10) [28]. Ten items assess limitation in performing physical tasks due to health problems such as running, lifting/carrying, climbing stairs, and walking one block. Response options include 1 (limited a lot), 2 (limited a little) and 3 (not limited at all). The total score is the sum of the item scores. The PF10 has shown good test-retest reliability ($r=0.81$) [29] and it discriminates between people with minor or serious chronic medical conditions [28].

Analysis

Bivariate analysis of the four types of social support, number of close friends and relatives, presence of a spouse or partner and participation was completed. Multiple linear regression was used to estimate the independent associations between participation and the types of social support that were significantly correlated with participation. The first block of variables included the four types of social support. Age, gender and number of health conditions [30] may influence both social support and participation, so the second

block of variables included these covariates. Depressive symptoms [31], [32] and physical function [3], [33] are strong predictors of participation that may influence social support or be influenced by social support. These were included in the third block of variables. A second regression analysis used social support as the dependent variable and examined the relationship between marital status and number of close friends and relatives and social support (block 1). Marital status and number of close friends and relatives were each expected to predict social support and therefore predict participation indirectly [6], [8]. Only the types of social support that significantly predicted participation were analyzed in this second set of models. Covariates included age, gender, and number of chronic conditions (block 2). Depressive symptoms and physical function were not included in the second analysis as they are not as strongly related to social support as to participation. Multicollinearity statistics were used to examine high correlations between predictor variables. Plots of residuals against predicted value and histograms of residuals were examined to determine violation of the assumptions of regression, specifically, equality of variance and normality of residuals [34]. SPSS 19.0 was used for all analyses.

The Keele Assessment of Participation, Social Support Survey, PF10, and CESD10 each contained some missing data. If 20% or less of a scale's items were missing, the sample mean for the missing item was imputed [35] and the total scale score was computed as usual. Data was imputed into 25 scales and involved 23 participants. The scales were the Keele Assessment of Participation (4 participants), Social Support Survey (13 participants), PF10 (3 participants) and CESD10 (8 participants). If greater

than 20% of a scale was missing, the total scale score was not computed and the variable was considered missing. Participants with missing variables were dropped from the analysis. Twenty-one participants were excluded due to missing data on one or more of the analysis variables and the final sample included 227 participants. Differences between included and excluded participants were compared using t-tests for continuous variables and chi-squared tests for categorical variables. The included and excluded participants did not differ significantly on any demographic or health characteristic or study variable.

The regression models involved up to 9 predictor variables. With a power of 0.80 and a level of significance of 0.05, 204 subjects were required to detect small/medium effect sizes ($F_{sq}=0.08$) [36].

Results

Characteristics of the Sample

Table 1 shows the characteristics of the sample. The sample included slightly more women than men. Participants reported a wide range of income levels and roughly half the sample had a household income of less than \$40,000 per year.

Participation and Social Support

The relationships between satisfaction with participation and the four types of social support and social network size were first examined using Pearson correlation coefficients (Table 2). Participation was significantly related to all types of social support at similar levels and to social network size at a lower level. Participation was slightly higher among people with a spouse or partner compared to people without (t-test $p=.01$, difference=0.2 points/5). All types of social support were higher among people with a

spouse or partner compared to people without (t -test $p < 0.05$, differences = 18-30 points/100). Table 3 shows the results of the multiple linear regression. Model 1 indicates that tangible support and positive social interaction support predicted participation when all types of support were considered together. Positive social interaction support predicted more than twice the amount of participation than tangible support. Model 1 explained 23% of the variance in participation.

When the covariates age, gender, and number of chronic conditions were considered (model 2), the standardized effect of tangible support and positive social interactions on satisfaction with participation decreased minimally (0.01 and 0.05 respectively). Age and gender were not significant predictors of participation in this model, while the fewer chronic conditions a person had, the higher the satisfaction with participation. Model 2 explained 27% of the variance in satisfaction with participation.

When depressive symptoms and physical function were added to the model (model 3), tangible support remained a significant predictor of satisfaction with participation at approximately the same value as model 2. Positive social support was also a significant predictor of satisfaction with participation but its standardized value decreased by half. Both depressive symptoms and physical function predicted participation, such that as depressive symptoms decrease, satisfaction with participation increases, and as physical function increases, satisfaction with participation increases. An increase of 25/100 points on either tangible support or positive social interaction support would lead to a 5% change in satisfaction with participation (0.25/5 points). When physical function or depressive symptoms were added separately to model 2 (i.e. one at a

time), the results were similar to model 3 except the relationship between positive social interaction support and participation was stronger. The standardized coefficients were 0.25 in the model containing physical function and 0.32 in the model containing depressive symptoms (results not shown). Model 3 explained 43% of the variance in participation.

The variance inflation factors for all predictors in the model were less than 5. Plots of unstandardized predicted values against unstandardized residuals for models 2 and 3 showed similar patterns. There was fairly constant variance across values of participation, with a slight decrease in variance at values approaching the maximum score (participation =5). The residuals for both models were normally distributed with a mean of zero.

Social Support and Social Networks

Tables 4 and 5 show the results of two regression analyses examining social support and aspects of social networks (presence of a spouse or partner and number of close friends or relatives). Presence of a spouse/partner and number of close friends both predicted tangible support (table 4). These relationships remained the same when the covariates age, gender and number of chronic conditions were included in the analysis and none of the covariates were significant predictors of tangible support (model 2). Presence of a spouse/partner would lead to an increase of 27/100 points in tangible support and presence of 10 close friends would lead to an increase of 5/100 points on the tangible support scale after adjusting for covariates.

Presence of a spouse/partner and number of close friends and relatives also predicted positive social interaction support (table 5). These relationships remained the same when the covariates age, gender and number of chronic conditions were included in the analysis (model 2). Presence of a spouse/partner would lead to an increase of 19 points on positive social interaction support, which is lower than the benefits of having a spouse/partner on tangible support. Presence of 10 close friends or relatives would result in an increase of 6 points on positive social interaction support. The covariates that significantly predicted positive social interaction support were gender and number of chronic conditions. Men would have a worse support than women by approximately 7/100 points. If the number of chronic conditions increased by one, the social support score would decrease by 3/100 points.

A plot of unstandardized predicted values against unstandardized residuals showed fairly constant variance across values of tangible support, with a slight decrease in variability at values approaching the maximum score (tangible support=100). The residuals were roughly normally distributed with a mean of zero. A plot of unstandardized predicted values against unstandardized residuals for positive social interaction support showed a more marked decrease in variability at values close to the maximum score than for tangible support but still relatively constant variance across values. The residuals for positive social interaction support were roughly normally distributed with a mean of zero.

Discussion

This study examined the relationships between four types of social support and satisfaction with participation and the relationships between characteristics of social networks and social support. The regression analyses indicated that participants who perceived greater tangible support and positive social interaction support had higher levels of satisfaction with participation than participants with lower levels of these types of support. A one standard deviation increase in tangible support predicted a 0.2 standard deviation increase in participation, and a one standard deviation increase in positive interaction support predicted a 0.4 standard deviation increase in participation, when controlling for age, gender, and number of chronic conditions. Emotional/informational and affectionate support did not predict satisfaction with participation in any of the regression models.

Presence of a spouse and higher number of close friends or relatives predicted increased tangible support and positive interaction support when controlling for age, gender and number of chronic conditions. Presence of a spouse predicted a 27/100 and 19/100 point increase in these types of support, respectively. An increase of one close friend or relative predicted a 0.5/100 increase in both types of support.

The findings of the analysis of the four types of social support and satisfaction with participation support previous research that showed that tangible support predicts participation [5]. The findings add to literature on social support by identifying that positive social interaction support, or the availability of other people for companionship, also predicts satisfaction with participation. In fact, positive social interaction support had

a greater impact on satisfaction with participation than tangible support when adjusting for age, gender and number of chronic condition covariates. This finding is somewhat surprising, given that the participation scale includes participation types that do not typically involve companionship (e.g. self-care). One interpretation could be that people who are satisfied with their social activities also tend to be satisfied with their self-care activities. Social support has a small impact upon satisfaction with participation, given that approximately a 25% increase in tangible or positive social interaction support would predict a 5% increase in participation. No information about minimum clinically important change in satisfaction with participation is available, but 5% may be a reasonable estimate. The study results suggest that a 25% increase in support is possible by expanding one's social network or finding a spouse/partner.

When depressive symptoms and physical function were added to the model along with age, gender and number of chronic conditions, increased tangible support and positive social interaction support remained predictors of participation. These findings contrast with a study by Anaby, Miller, Eng, Jarus and Noreau [37] that found no relationship between social support and participation for older adults with chronic conditions, when controlling for physical function, depressive symptoms, age, gender and number of chronic conditions. Anaby and colleagues [37] defined participation as level of accomplishment rather than as satisfaction with participation, as in the current study. Level of accomplishment may be more related to specific physical impairments for people with chronic conditions, whereas satisfaction with participation may also be related to social support.

After depressive symptoms and physical function were added to the model, the magnitude of the positive social interaction support coefficient decreased by about half, whereas the magnitude of tangible support did not change substantially. Adding physical function alone or depressive symptoms alone also resulted in a decrease in the magnitude of the relationship between positive social interaction support on participation. These findings suggest that depressive symptoms and physical function may covary with positive interaction support or may mediate the relationship between positive social interaction support and participation. Tangible support may be less related to depressive symptoms and physical function because this type of support is most predicted by presence of a spouse/partner, a condition that is not likely to change with changes in depression or physical function.

The study results showed that while emotional/informational and affectionate support were correlated with satisfaction with participation, they did not predict satisfaction with participation when all types of support were considered together. Emotional/informational support refers to the availability of someone to talk to and receive advice from and affectionate support refers to the availability of affection. These types of support may be less closely linked to participating in activities than tangible support, which is related to activities such as meals and chores, or positive social interaction support, which is related to companionship in activities. These differences in content may explain the differences in results. While not a significant relationship, a counter-intuitive finding is that the coefficient for the relationship between emotional/informational support and satisfaction with participation is negative.

Emotional/informational support items address the availability of an advisor or listener. One explanation could be that people with high levels of satisfaction with participation have no need or desire for an advisor. Alternatively, the inverse relationship could indicate that the advice is unwanted and has a detrimental effect on satisfaction with participation.

The study findings relate to theory in that presence of a spouse/partner had a much larger impact on social support than number of close friends and relatives. This finding supports the premise that social support usually comes from closer network members [6]. The findings also showed that presence of a spouse/partner and number of close friends or relatives are more closely related to social support than to satisfaction with participation. Differences between people with and without a spouse/partner were greater for social support than for satisfaction with participation. In addition, number of close friends and relatives correlated more strongly with social support than with satisfaction with participation. These findings give support to Berkman and colleagues' [6] theory of social networks and health, which states that social networks lead to social support, which then leads to better health. Social networks can also provide benefits through mechanisms beyond social support [6] and future research could examine these mechanisms.

Presence of a spouse/partner predicted social support more strongly than number of close friends and relatives predicted social support. The difference between these two predictors of support was smaller for positive social interaction support. This finding may reflect the fact that providing help with meals and chores is more likely to be performed

by a spouse/partner than by a friend or relative outside of the home. Companionship can be provided by both a spouse/partner or a friend or relative.

The study results may be limited in generalizability due to its sample of people registered at a family health centre who were willing to take part in a survey. These individuals may differ from the general population in that they may have better health or greater resources to access health care. The study participants also reported relatively high levels of satisfaction with participation and social support. This limited variability can bias regression coefficients toward zero and underestimate the relationships between variables. The study is also limited by its cross-sectional design because conclusions about causation cannot be made. Longitudinal research regarding participation and social support is needed to determine how each can be improved. Longitudinal research regarding social support and health and function has shown mixed results. Among adults with rheumatoid arthritis, no evidence was found that higher levels of social support can improve physical function or psychological distress over time [38]. Conversely, a study of older women with heart disease found that higher positive social interaction support and emotional support were related to improved self-rated health over time [39]. The impact of social support on a variety of health outcomes, including participation, needs further exploration. Finally, the relatively high correlations between the types of social support suggest that multicollinearity may have existed between these variables and significant relationships between types of social support and participation may have been undetected. The variance inflation factor values suggest that multicollinearity was not a

serious issue, as none of the values exceeded 10, the suggested level for identifying collinearity problems [34].

The findings presented here suggest that there is a need to focus on building social networks and social support for older adults with chronic conditions. The networks could involve people that could offer concrete assistance with daily living tasks and also people that could offer and receive companionship. Health professionals working in family practices, community health centres, or home care could assess social support levels and provide interventions to improve it. For example, support groups can lead to increased tangible support [40]. Other interventions could include education, network building, and reaching out to people who are isolated.

Within communities, public and community health professionals can offer programs and events within recreation centres, senior centres, or community groups to help residents become more inter-connected and supportive of each other. Volunteer networks could also be created and expanded to provide support to older adults with chronic conditions.

Policy could also be implemented that provides more tangible support to older adults with chronic conditions. Support services for household chores, meals, or errands could be established or expanded. Often support is not provided to individuals with fluctuating functional difficulties, which are common among people with chronic conditions. Changes to policy could provide support to people when their symptoms limit their participation.

Conclusion

This study filled a gap in research regarding social support and participation among older adults with chronic conditions by examining four types of social support. The results demonstrated the importance of two types of social support in predicting satisfaction with participation. Targeting and developing tangible and social interaction support may help to facilitate satisfaction with participation for older adults with chronic conditions. Creating networks for companionship may be equally as important as providing support for daily living needs.

Future studies could examine the influence of social networks on participation, longitudinal relationships between social support and participation, and continue to examine different types of social support. Such research could help to determine the pathways involved in the relationship between social support and participation.

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*Table 1*Demographic and Health Characteristics of Participants

Age (Mean, SD)	73 (7.7)
<hr/>	
Number of chronic conditions (Mean, SD)	3.8 (1.8)
<hr/>	
Gender (Frequency, %)	
Men	96 (42.3)
Women	131 (57.7)
<hr/>	
Yearly Household Income (\$CDN, frequency, %)	
Less than \$20,000	50 (22.0)
\$20,000 to \$39,000	63 (27.8)
\$40,000 to \$59,000	47 (20.7)
\$60,000 to \$79,000	16 (7.0)
\$80,000+	21 (9.3)
No answer	30 (13.2)
<hr/>	

Table 2

Correlations between Study Variables

	Participation	Tangible support	Emotional/informational	Affectionate	Positive social interaction
Tangible	0.38				
Emotional/informational	0.39	0.72			
Affectionate	0.36	0.63	0.77		
Positive social interaction	0.47	0.63	0.84	0.76	
Number of close friends and relatives	0.19	0.29	0.33	0.28	0.33

Note: All $p \leq 0.05$

Table 3

Associations between Participation and Social Support					
	Unstandardized coefficients		Standardized Coefficients	Significance	R ²
	B	SE	β	p-value	
Model 1					.23
Constant	3.30	0.14		0.00	
Tangible	0.01	0.00	0.19	0.03	
Emotional/ informational	0.00	0.00	-0.13	0.32	
Affectionate	0.00	0.00	0.00	0.92	
Positive social interaction	0.01	0.00	.46	0.00	
Model 2					.27
Constant	3.75	.44		0.00	
Tangible	0.01	0.00	0.20	0.03	
Emotional/ informational	0.00	0.00	-0.17	0.17	
Affectionate	0.00	0.00	0.03	0.76	
Positive social interaction	0.01	0.00	0.41	0.00	
Age	0.00	0.01	-0.01	0.91	
Gender	-0.04	0.09	-0.02	0.70	
Number chronic conditions	-0.07	0.02	-0.19	0.00	
Model 3					.43
Constant	2.64	0.51		0.00	
Tangible	0.01	0.00	0.19	0.02	
Emotional/ informational	-0.01	0.00	-0.18	0.11	
Affectionate	0.00	0.00	0.05	0.57	
Positive social interaction	0.01	0.00	0.21	0.05	
Age	0.01	0.01	0.07	0.21	
Gender	-0.10	0.08	-0.07	0.20	
Number chronic conditions	0.00	0.02	0.00	0.95	
Depressive symptoms	-0.03	0.01	-0.26	0.00	
Physical function	0.05	0.01	0.37	0.00	

Note: SE=standard error, gender reference category is female

Table 4

Associations between Tangible Support and Social Network Variables					
	Unstandardized coefficients		Standardized Coefficients	Significance	R ²
	B	SE	β	p-value	
Model 1					.31
Constant	50.93	2.63		0.00	
Spouse/partner	28.37	3.30	0.48	0.00	
Number of close friends	0.57	0.14	0.23	0.00	
Model 2					.33
Constant	35.81	17.50		0.04	
Spouse/partner	27.27	3.78	0.46	0.00	
Number of close friends	0.53	0.14	0.22	0.00	
Age	0.27	0.22	0.07	0.23	
Gender	3.47	3.64	0.06	0.34	
Number of chronic conditions	-1.29	0.92	-0.08	0.16	

Note: gender reference category is female.

Table 5

Associations between Positive Social Interaction Support and Social Network Variables					
	Unstandardized coefficients		Standardized Coefficients	Significance	R ²
	B	SE	β	p-value	
Model 1					.22
Constant	60.40	2.48		0.00	
Spouse/partner	17.70	3.11	0.34	0.00	
Number of close friends	0.63	0.13	0.29	0.00	
Model 2					.28
Constant	58.58	16.10		0.00	
Spouse/partner	19.48	3.48	0.37	0.00	
Number of close friends	0.55	0.13	0.25	0.00	
Age	0.21	0.21	0.06	0.31	
Gender	-7.36	3.35	-0.14	0.03	
Number of chronic conditions	-2.86	0.85	-0.20	0.00	

Note: gender reference category is female.

CHAPTER 5: Thesis Discussion and Conclusions

The purpose of this chapter is to summarize and discuss the information from the previous three chapters. It will summarize the findings, draw links between the chapters, relate the findings to theory, discuss the strengths and limitations of the line of inquiry, and make recommendations for practice, policy and future research. Repetition of specific information from individual papers will be kept to a minimum and the focus will be on overall discussion of study results and implications.

Summary of Findings

This thesis forms the beginning of a line of research inquiry examining environmental influences on satisfaction with participation among older adults with chronic health conditions. The purpose of the scoping review in Chapter 2 was to describe and synthesize research regarding the influence of neighbourhood characteristics on participation among older adults with chronic conditions. The scoping review established the relevance of neighbourhood characteristics to participation in everyday activities. The review showed that neighbourhood economic status, amenities, problems, mobility barriers, cohesion, and safety are related to participation among older adults and older adults with chronic conditions. The review also found that the pathways through which neighbourhood characteristics affect participation are not clear. One study suggested that social cohesion may mediate the relationship between neighbourhood characteristics such as neighbourhood problems and participation. Thus, fewer neighbourhood problems may promote good social cohesion which promotes participation. Theory corresponds with this finding; neighbourhood characteristics may

encourage people to spend time in their neighbourhoods, make connections with one another, and gain social support to participate (Berkman et al., 2000). Another pathway suggested by theory is that neighbourhood characteristics such as presence of amenities, a safe environment, and few physical barriers encourage walking and other forms of physical activity that may promote health and participation (Glass & Balfour, 2003). Alternatively, neighbourhood characteristics such as amenities may directly affect participation, for example, by providing opportunities to participate. The articles included in the review tended to focus on older adults rather than older adults with chronic health conditions, used cross-sectional designs, and measured limitation in or frequency of participation. Most studies considered individual factors in their analyses but did not consider the influence of social support. The recommendations in the review included future research that examines neighbourhood characteristics, social support, social networks, and the individual's characteristics together and aspects of participation aside from frequency and limitation.

The recommendations made in the scoping review were used to develop the design of the study described in the second manuscript (Chapter 3). The aim of the study was to examine the relationships between perceptions of neighbourhood characteristics and satisfaction with participation in everyday activities among 248 older adults with chronic health conditions. The specific objectives of the study were to (1) test a model regarding the relationship between perceptions of neighbourhood characteristics, the individual's social environment and satisfaction with participation in everyday activities and (2) test the applicability of the model to different genders and age groups. The

analysis showed that all variables included in the model had significant relationships with other variables and revealed the pathways through which neighbourhood characteristics may influence satisfaction with participation. Two indirect pathways linked neighbourhood amenities and safety to satisfaction with participation. These neighbourhood characteristics predict neighbourhood cohesion, which predicts social support. Higher levels of social support directly predict increased satisfaction with participation. One direct pathway linked neighbourhood problems and satisfaction with participation. Neighbourhood problems such as traffic, noise, graffiti and litter directly predict satisfaction with participation and do not appear to predict neighbourhood cohesion. The largest neighbourhood predictor of satisfaction with participation is neighbourhood problems, followed by neighbourhood cohesion and safety. The pathway from neighbourhood amenities to satisfaction with participation was non-significant. The model testing also revealed that physical function is the largest direct predictor of satisfaction with participation, followed by depressive symptoms, social support, and neighbourhood problems. The final model that included neighbourhood characteristics, social factors, physical function and depressive symptoms fit both genders and different age groups well. There were minimal differences in the models fitted to these subgroups.

Given the large strong relationship between social support and satisfaction with participation, the third manuscript (Chapter 4) examined in more detail the relationship between social support and satisfaction with participation. The purpose of this study was to determine the types of social support that most strongly predict satisfaction with participation and to examine whether number of close friends and relatives and presence

of a spouse or partner predict social support. The results showed that tangible, emotional/informational, affectionate and positive social interaction support are correlated with satisfaction with participation. When considered together in a multiple regression, greater tangible support and positive social interaction support predict increased satisfaction with participation, while emotional/informational support and affectionate support do not. Tangible and positive social interaction support also remained predictors of satisfaction with participation when controlling for age, gender, number of chronic conditions, physical function and depressive symptoms. Thus the availability of assistance (tangible support) and availability of a companion (positive social interaction support) each independently predict satisfaction with participation. Tangible support and positive social interaction support are each predicted by presence of a spouse/partner and number of close friends and relatives.

Main Findings

The main findings of this thesis are summarized in the following points:

Chapter 2:

- There is limited research regarding the influence of neighbourhood characteristics on participation in older adults with chronic health conditions.
- Although various studies have identified neighbourhood characteristics that are related to participation, previous research has not identified the pathways through which neighbourhood characteristics affect participation.
- Research regarding older adults generally and older adults with chronic health conditions tends to use cross-sectional designs, measure limitation in or frequency of

participation, and consider individual factors but not social support in their analyses.

These qualities limit the conclusions that can be drawn from study results.

Chapter 3:

- Neighbourhood characteristics predict satisfaction with participation even after accounting for the effects of the social environment (social support and network size) and individual limitations (physical function and depressive symptoms).
- Fewer neighbourhood problems directly predict increased satisfaction with participation, while higher levels of neighbourhood safety and cohesion indirectly predict satisfaction with participation. The indirect effect of neighbourhood amenities on satisfaction with participation did not reach statistical significance.
- The strongest predictor of satisfaction with participation was physical function, followed by depressive symptoms, social support, and neighbourhood problems.
- Neighbourhood safety, cohesion and social network size have similar, small indirect effects on satisfaction with participation.
- Social support predicts satisfaction with participation directly. Social support and neighbourhood cohesion mediate the influence of neighbourhood amenities and safety on satisfaction with participation. This represents new knowledge regarding the mechanisms through which neighbourhood characteristics may influence participation.
- This study also contributes new knowledge by showing that a range of neighbourhood characteristics are related to satisfaction with participation, in addition to other studies that demonstrated links between neighbourhood characteristics and frequency of or limitation in participation.

Chapter 4:

- Higher levels of tangible support and positive social interaction support predict greater satisfaction with participation, after controlling for age, gender, number of chronic health conditions, physical function and depressive symptoms.
- The finding that tangible support, or assistance from others, predicts satisfaction with participation corresponds to social support literature. The finding that positive social interaction support, or the availability of other people for companionship, predicts satisfaction with participation is a new contribution to social support literature.
- Emotional/informational and affectionate support do not independently predict satisfaction with participation.
- Tangible and positive social interaction support are predicted by the presence of a spouse or partner and number of close friends or relatives.
- Presence of a spouse/partner and number of close friends/relatives are more strongly linked to social support than to satisfaction with participation. This finding corresponds to theory stating that social networks predict social support which in turn predicts health and participation.

Links between Chapters

The findings of the papers in this thesis can be related to one another. Chapter 2 described the gaps in research regarding participation among older adults with chronic conditions and made recommendations regarding future research. These recommendations included more research into neighbourhood influences on participation in older adults chronic conditions; research that examines a range of neighbourhood

characteristics and includes relevant covariates such as the individual's characteristics and social environment; and research that examines dimensions of participation beyond frequency and limitation. The design of the study that Chapters 3 and 4 are based upon incorporated these recommendations.

Chapters 3 and 4 involved different variables and analyses but included similar models in their results. The final model in Chapter 3 included neighbourhood variables, social support, social network size, physical function and depressive symptoms and explained 44% of the variance in satisfaction with participation. The first model in Chapter 4 included four types of social support, age, gender, number chronic conditions, physical function and depressive symptoms and explained 43% of the variance in satisfaction with participation. The strongest predictors of satisfaction with participation in both models were social support, physical function, and depressive symptoms. While these models explained similar proportions of the variance in satisfaction with participation, the model that included neighbourhood variables provided more information about predictors of social support and the model in Chapter 4 provided more information about the types of social support that best predict satisfaction with participation.

Another similarity in findings between Chapters 3 and 4 is that social networks predicted satisfaction with participation through social support in both models, rather than directly. The modeling process described in Chapter 3 did not suggest that social network size and participation should be linked directly, and correlation analysis in Chapter 4 showed that social network size was more strongly related to social support

than to participation. These findings are likely related to the fact that the social network variable focused on close social contacts, who are more likely to provide social support than less close social contacts. More casual social networks may influence health and participation without influencing social support, such as by providing opportunities for participation or access to other resources such as health care and housing (Berkman et al., 2000).

The findings described in Chapter 3 can also be used to expand the findings of the scoping review in Chapter 2. The findings in Chapter 3 support the conclusions of the scoping review that neighbourhood problems, cohesion and safety predict participation. In Chapter 3, neighbourhood amenities were not as strongly related to satisfaction with participation as other neighbourhood variables, however, the findings of the scoping review suggest that a relationship exists. The findings in Chapter 3 also support the recommendation in the scoping review that social support should be considered when examining neighbourhood characteristics and participation. Chapter 3 showed that social support is a strong predictor of satisfaction with participation and a mediator in the relationships between some neighbourhood characteristics and satisfaction with participation.

Relation of Findings to Theory

This thesis was guided by broad frameworks that include the environment, personal characteristics, and participation: the ICF framework (WHO, 2002b) and the PEO model (Law et al., 1996). While the ICF is a classification framework and not a full theory, its widespread use and applicability to all fields of health make it a good tool to

guide research regarding the interdisciplinary area of neighbourhoods and health. Within the ICF, health is composed of 1) an individual's body functions and structures, 2) physical and mental activities that the person is capable of performing, and 3) the everyday activities in which the person participates. Physical and mental activities may include lifting or concentrating, while participation includes more complex activities such as self care or volunteering. Participation is influenced by body functions and structures and physical and mental activities as well as by the environment, personal characteristics, and the person's health conditions. The findings of this thesis support the ICF's premise that participation is affected by a range of personal and environmental factors.

The ICF framework (WHO, 2002b), the PEO model (Law et al., 1996), and Glass and Balfour's (2003) model of neighbourhood effects on aging also include the concept of person-environment fit. The PEO model expands this concept to person-environment-occupation fit while the other models implicitly include the activity/occupation in which a person participates. When environment factors match the needs of the person, ideal fit is achieved and participation is optimal. The findings of this thesis identified the neighbourhood and social factors that can optimize participation for older adults with chronic conditions. The findings of this thesis also showed that environment and person factors can interact. In paper 2, when testing fit of the final model to different genders, participation among women was predicted by neighbourhood problems whereas participation among men was not. This finding reinforces the idea that person-environment fit is unique to each person.

Within a universal framework such as the ICF, gaps exist regarding the mechanisms through which participation is influenced by personal and environmental factors. Berkman and colleagues (2000) suggest that closer social environments have more influence on health than more distal social environments. The findings of paper 2 (Chapter 3) support this assumption, in that neighbourhood cohesion did not directly predict satisfaction with participation, while social support from family and friends did. Similarly, neighbourhood physical environments may predict participation more than city-wide physical environments.

The findings of paper 2 also relate to the Chronic Care Model that is used to guide clinical practice with individuals with chronic health conditions (Wagner et al., 2001). This model places the health system within the community and states that effective chronic care requires community resources outside of the health system. These resources may be community health interventions or social programs. While the neighbourhood resources considered in this thesis are not necessarily health or social services, they are nonetheless factors that may influence health outcomes. The finding that neighbourhood characteristics may facilitate satisfaction with participation suggests that neighbourhood characteristics could be considered as supports to chronic care within the Chronic Care Model. Broadening the Chronic Care Model in this way could prompt development of community resources beyond health and social services that could improve the health and quality of life of older adults with chronic health conditions.

The findings of paper 3 (Chapter 4) support Berkman and colleagues' (2000) model of social networks and health. Social networks predicted social support and social

support predicted participation, relationships that are stated in the model. Participation can be considered part of health within this model. The findings in paper 3 can help to expand Berkman's model by identifying that tangible and positive social interaction support are most important in predicting participation/health among older adults with chronic conditions. Berkman and colleagues identified three pathways through which social support may influence health: health behavioural, psychological, and physiologic pathways. Incorporating the findings of paper 3 into the model, tangible support may promote health behaviours such as help-seeking behaviour and adherence to medical treatments as well as psychological processes such as coping and depression. Positive social interaction support may promote the health behaviour exercise as well as the psychological processes self-esteem and sense of well-being.

Strengths and Limitations

This thesis describes a systematic approach to the topic of environmental influences on satisfaction with participation among older adults with chronic health conditions. The first paper reviewed and synthesized the available literature regarding neighbourhood influences on participation for older adults with chronic health conditions, providing a base from which to develop the subsequent study. Paper 2 (Chapter 3) built on previous research by including more relevant environmental variables in a single model than previous studies had included. In addition, the analysis allowed for all variables to be considered simultaneously and identified pathways through which neighbourhood characteristics may affect participation. This study also formed the basis of paper 3 (Chapter 4) and involved a measure of participation that covers all areas of life

and measures satisfaction, a concept that may be relevant to more people, especially with impairments, than level of accomplishment or frequency of activity. The study also used valid and reliable scales and used methods to maximize response rate including invitation from the person's physician and reminder post cards.

Several limitations of the approach are apparent. The scoping review revealed mostly quantitative studies with cross-sectional designs. A qualitative study to explore some of the issues that were identified in the scoping review may have helped to identify more areas to investigate in a quantitative study. The sample for papers in Chapters 2 and 3 was drawn from family health centres and had relatively high satisfaction with participation. The results may be limited in generalizability to people who want to and are able to access health services and who tend to be satisfied with their participation. People with lower levels of satisfaction with participation may be affected by neighbourhood characteristics and social support in different ways than those identified in this thesis. For example, neighbourhood safety or emotional support may play a larger role in predicting satisfaction with participation. The sample also reported relatively positive levels of social support and perceptions of neighbourhood characteristics. The limited variability of these responses may have lead to underestimating the path and regression coefficients in papers 2 and 3. The cross-sectional design of these two papers limits drawing conclusions about causality. Incorporating different study designs may have provided more complete information about the topic. Finally, the scales used to measure neighbourhood characteristics were brief and did not provide specific information about neighbourhood characteristics that predict participation.

Recommendations

Clinical and Policy Implications

Improving participation among individual clients and client groups is a major goal for health professionals and public health professionals. The results of this study suggest several actions that could be taken to improve satisfaction with participation among older adults with chronic health conditions. Implementing these recommendations may also improve satisfaction with participation in people of different ages and health conditions or disabilities.

Modify neighbourhood conditions.

The findings of the second paper showed that neighbourhood cohesion, safety, and problems predict satisfaction with participation and that neighbourhood amenities may predict satisfaction with participation. City officials, service groups and health professionals can work with residents make neighbourhood changes in these areas through community based participatory research (Schulz, Krieger, & Galea, 2002) that could identify specific needs of the community and work to address those needs. For example, neighbourhood cohesion could be promoted through events and programs within communities such as health fairs, cultural events, and exercise or leisure programs.

Community members can also work with city officials, local businesses, health professionals and researchers to establish needed stores in their neighbourhoods (e.g., 2040 Partners for Health, 2011). Senior centres could link with local businesses to improve services for older adults. Existing locations in neighbourhoods could be developed into amenities and ‘places to go’ by hosting events at local schools and

recreation centres (WHO, 2007b). Health care professionals can also consider offering services in local neighbourhoods rather than at centralized sites.

Neighbourhood amenities that encourage physical activity may also increase participation in older adults with chronic conditions. Characteristics of age-friendly cities include clean, pleasant and accessible buildings, green space and benches, safe street crossings, well-maintained and accessible sidewalks, and reliable and affordable public transportation (WHO, 2007a). Community members and health professionals can work to incorporate these features into their neighbourhoods.

The findings of this thesis could also be used to inform policy. A WHO study of age-friendly cities found that urban planners and architects need education about the needs of older people (WHO, 2007b). The findings of this thesis could be used in helping policy makers to understand the factors that impact participation and quality of life for older adults with chronic conditions. A current strategic framework regarding people with chronic conditions recommended that policies be implemented to create healthy environments that minimize the effects of chronic conditions (United States Department of Health and Human Services, 2010). The findings of this thesis suggest that healthy environments include places to go, safety, and few problems such as traffic and crime.

The findings of this thesis could also be used to promote policy regarding amenities and safety. Policy could support local businesses and create zoning to encourage amenities to exist close to residential areas. Measures to improve safety could include security cameras, funds for residents to improve their own security, or organization of community safety groups (WHO, 2007b).

Improve social support.

The findings of the second and third paper highlighted the importance of social support in facilitating satisfaction with participation, in particular tangible support and positive social interaction support. Existing health services and programs for individuals with chronic health conditions could incorporate methods to help participants develop social supports. Social support has been used as a means to promote physical activity among midlife women and lead to improved tangible support (Peterson, Yates, & Hertzog, 2008). Despite such programs, a focus on social support is not always present in health services. For example, chronic disease self-management programs promote knowledge development, self-efficacy, and self-management of health conditions (Lorig et al., 1999; Osborne, Wilson, Lorig, & McColl, 2007) but not typically the development of social support. Interventions to develop social support in community members could include education, network building, and reaching out to people through existing channels such as recreation centres, senior centres, or community groups. Volunteer networks could be created and expanded to provide more support to older adults with chronic conditions.

Policy could also be implemented that provides more tangible support to older adults with chronic conditions. Support services for household chores, meals, or errands could be established or expanded. Often support is not provided to individuals with fluctuating functional difficulties, which are common among people with chronic conditions. Changes to policy could provide support to people when their symptoms limit their participation.

Future Research

The findings of this thesis suggest several research directions. The first is in exploring additional pathways through which neighbourhood characteristics influence participation. Potential research could address the following questions:

- Do neighbourhood amenities, safety, and fewer problems influence participation by creating more opportunities?
- Do these neighbourhood characteristics lead to more physical activity and walking, leading to increased ability to participate?
- Do these neighbourhood characteristics lead to increased social contact and increased familiarity with neighbours leading to support in participating?

These questions may be best answered through cross-sectional research that tests more complex models than those presented in this thesis or through longitudinal research that can identify causes and effects.

A second line of inquiry is in examining neighbourhood amenities in more depth. While in this thesis, neighbourhood amenities did not predict satisfaction with participation at a significant level, this finding may be due to the brief scale used to assess amenities. Examining specific neighbourhood amenities that may influence participation, neighbourhood cohesion, and social support could identify significant relationships and provide more detailed information. This goal could be achieved through qualitative research that identifies a range of amenities, followed by quantitative research that tests the hypotheses generated.

A final area of research that could build upon the findings of this thesis is community-based participatory research aimed at changing neighbourhood conditions. This research approach has generated success in promoting physical activity (Suminski, Petosa, Jones, Hall, & Poston, 2009). Participatory research could help to identify specific neighbourhood problems, for example, that can be addressed. Whether a study aims to improve participation or not, measuring the impact of participatory research on participation could also provide important information.

Conclusion

Older adults with chronic health conditions can experience a range of symptoms and associated impairments in physical and mental function. To promote their health and quality of life, the environments in which they live need to be developed to support participation in everyday activities. This thesis explored neighbourhood and social factors that may influence satisfaction with participation among older adults with chronic health conditions. The thesis built on previous research by examining neighbourhood, social and individual variables together, by assessing satisfaction with participation, and by investigating different types of social support that may predict participation. New knowledge presented in this thesis include the following findings: neighbourhood characteristics predict participation even after accounting for the effects of social and individual factors; a potential pathway from neighbourhood characteristics to participation includes neighbourhood cohesion and social support; and higher levels of positive social interaction support predict greater satisfaction with participation.

The findings of this thesis suggest that neighbourhood characteristics affect satisfaction with participation directly, and indirectly, by predicting social support which predicts satisfaction with participation. Tangible support and positive social interaction support most strongly predict satisfaction with participation. The findings in this thesis help to better understand neighbourhood and social predictors of participation. Neighbourhood characteristics and social support can be targeted in clinical or policy interventions to facilitate satisfaction with participation. Future research can investigate additional mechanisms, explore neighbourhood characteristics in more detail, or create neighbourhood change to facilitate participation.

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Appendix A: Consent Form



[date]

Dear [participant name],

We are contacting you on behalf of Carri Hand, a PhD student at McMaster University, and Dr. Mary Law, a professor at McMaster University. They are conducting a study about older adults who have arthritis, diabetes, heart disease, or a lung condition, and we think you would be a good candidate for this study.

The following documents were prepared by Ms. Hand and Dr. Law. There is a description of the study, two consent forms, and a questionnaire.

We hope you will consider participating in this interesting study. Your decision will not affect the quality of care you receive at our centre in any way.

Sincerely,

[Family Physician's name]
Family Physician

[Unit Director's name]
Unit Director

A Study of Neighbourhoods and Participation in Everyday Activities Among Older Adults

Investigators:

Researcher: Carri Hand
PhD Student
School of Rehabilitation Science
McMaster University
Hamilton, Ontario, Canada
905-525-9140 ext. 21454

Supervisor: Dr. Mary Law
Professor and Associate Dean
School of Rehabilitation Science
McMaster University
Hamilton, Ontario, Canada
905-525-9140 ext. 22666

You are being invited to participate in a research study involving adults age 60 years or more who have a chronic condition, such as arthritis, diabetes, heart disease or a lung condition. This form gives information about what is involved in the study and the potential risks and benefits. Please read the information carefully. If you have any questions, you may contact one of the investigators listed above.

WHY ARE WE DOING THIS STUDY?

Activities such as getting groceries, exercising, and socializing with friends may be affected by the resources available in a neighbourhood. We are doing this study to explore neighbourhood characteristics that affect everyday activities for older adults with chronic conditions. We would like to find out what changes governments and communities could make to neighbourhoods to make life better for older adults with chronic conditions.

WHAT WILL MY RESPONSIBILITIES BE IF I TAKE PART IN THE STUDY?

If you volunteer to participate in this study, we ask that you complete and return one consent form and the enclosed questionnaire. It should take about 15 minutes to complete. You may complete the questionnaire over the telephone if you would prefer, by calling Carri Hand at 905-525-9140 ext 21454.

We will also ask you if we can contact you one year from now for a follow-up. If you agree, at that time we will send you another questionnaire for you to complete and return. You can still participate in the study now if you do not want to be contacted again later.

WHAT ARE THE POSSIBLE BENEFITS FOR ME AND/OR FOR SOCIETY?

We cannot promise any personal benefits to you from your participation in this study. However, we hope that we will learn more about the factors that affect everyday activities among older adults with chronic conditions. This knowledge could help health professionals plan programs and city planners to design neighbourhoods. You can receive a summary of the study results if you wish. Choosing not to participate in this study will not affect your care or treatment.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?

There are minimal risks to participating in this study. Some questions are about your feelings and may cause some discomfort in answering them.

Your decision to join the study will not affect the quality of care you receive at the health centre in any way.

HOW MANY PEOPLE WILL BE IN THIS STUDY?

About 125 people from Stonechurch Family Health Centre and 125 people from North Hamilton Community Health Centre will be in the study.

WHAT INFORMATION WILL BE KEPT PRIVATE?

Your data will not be shared with anyone except with your consent or as required by law. All personal information such as your name and address will be removed from the data and will be replaced with a number. A list linking the number with your name will be kept in a secure place, separate from your file. The data, with identifying information removed will be securely stored in a locked office. The data for this research study will be retained for 10 years.

For the purposes of ensuring the proper monitoring of the research study, it is possible that a member of the Hamilton Health Sciences/FHS McMaster University Research Ethics Board may consult your research data. However, no records which identify you by name or initials will be allowed to leave the university. By signing this consent form, you authorize such access. If the results of the study are published, your name will not be used and no information that discloses your identity will be released or published.

If you volunteer to be in this study, you may withdraw at any time. You have the option of removing your data from the study. This will in no way affect the quality of care you receive at this centre. You may also refuse to answer any questions you don't want to answer and still remain in the study.

WILL I BE PAID TO PARTICIPATE IN THIS STUDY?

You will not receive any payment to participate. When you return your questionnaire, your name will be entered into a draw to receive a \$100 gift certificate at any store you would like.

IF I HAVE ANY QUESTIONS OR PROBLEMS, WHOM CAN I CALL?

If you have any questions about the research now or later, please contact Carri Hand at 905-525-9140 ext. 21454.

If you have any questions regarding your rights as a research participant, you may contact the Office of the Chair of the Hamilton Health Sciences/Faculty of Health Sciences Research Ethics Board at 905-521-2100, ext. 42013.

CONSENT STATEMENT

I have read the preceding information thoroughly and I understand the information. I agree to participate in this study and will complete and return the questionnaire and this consent form. I will keep a signed copy of this form for my records.

Name of Participant (Please print)

Signature of Participant

Date

Telephone number (This will be used only regarding the gift certificate draw or if any questionnaire information needs clarification)

May we contact you in one year regarding a follow-up questionnaire? At that time you can decide whether to participate in the follow-up study.

- Yes, you may contact me again. (Please provide contact information below)
 No, please do not contact me.

Would you like to receive a written summary of the study results?

- Yes (Please provide contact information below)
 No

Street Address: _____

City: _____ Postal Code: _____

CONSENT STATEMENT

I have read the preceding information thoroughly and I understand the information. I agree to participate in this study and will complete and return the questionnaire and this consent form. I will keep a signed copy of this form for my records.

Name of Participant (Please print)

Signature of Participant

Date

Telephone number (This will be used only regarding the gift certificate draw or if any questionnaire information needs clarification)

May we contact you in one year regarding a follow-up questionnaire? At that time you can decide whether to participate in the follow-up study.

- Yes, you may contact me again. (Please provide contact information below)
 No, please do not contact me.

Would you like to receive a written summary of the study results?

- Yes (Please provide contact information below)
 No

Street Address: _____

City: _____ Postal Code: _____

Appendix B: Questionnaire



A Study of Neighbourhoods and Participation in Everyday Activities among Older Adults

Questionnaire

January 2010

Thank you for taking the time to answer a few questions about your neighbourhood and your activities. The information collected will help local governments and communities make changes to neighbourhoods to make life better for all neighbourhood residents, but especially those who are older and may have chronic health conditions.

Because everyone's experience is different, your responses to this survey are **very important**. This survey will take about 15 minutes to complete.

If you have any questions, please contact Carri Hand at 905-525-9140 ext. 21454.

SECTION 1: YOUR NEIGHBOURHOOD

We would like to find out what you think about your neighbourhood (for example, places within about a 15 – 20 minute walk from your home).

Please circle the response that is closest to how **you** feel.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. I have a lot in common with people in my neighbourhood.	1	2	3	4	5
2. I am good friends with many people in this neighbourhood.	1	2	3	4	5
3. I generally trust my neighbours to look out for my property.	1	2	3	4	5
4. I would be sorry if I had to move away from the people in my neighbourhood.	1	2	3	4	5
5. People in my neighbourhood are willing to help each other out.	1	2	3	4	5
6. My neighbours treat me with respect.	1	2	3	4	5
7. I like living where I live.	1	2	3	4	5
8. It is safe to walk around the neighbourhood at night.	1	2	3	4	5
9. Children are safe walking around the neighbourhood during the day.	1	2	3	4	5

(King et al., 2003)

Please circle the number to show how big a problem each issue is in your neighbourhood.

	Not a problem						Very big problem
	0	1	2	3	4	5	6
10. Traffic	0	1	2	3	4	5	6
11. Noise	0	1	2	3	4	5	6
12. Crime	0	1	2	3	4	5	6
13. Air quality	0	1	2	3	4	5	6
14. Litter and garbage	0	1	2	3	4	5	6
15. Graffiti	0	1	2	3	4	5	6

(Bowling et al., 2006)

Please enter a number to answer the following questions.

16. How long have you lived in your current home?

_____years _____months

17. How long have you lived in your current neighbourhood?

_____years _____months

Please circle the answer that best applies to you and your neighbourhood.
Within walking distance means within a 10-15 minute walk from your home.

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
18. Stores are within easy walking distance of my home.	1	2	3	4
19. There are many places to go within easy walking distance of my home.	1	2	3	4
20. It is easy to walk to a transit stop (bus, train) from my home.	1	2	3	4

(NEWS-A, Cerin et al., 2006)

SECTION 2: YOUR HEALTH AND FUNCTIONING

21. Please circle the number that best describes your answer.
In general, would you say your health is:

Excellent	Very Good	Good	Fair	Poor
1	2	3	4	5

22. The following items are about activities you might do during a typical day. Does **your health now limit you** in these activities? If so, how much? (Circle one number on each line)

Activities	Yes, limited a lot	Yes, limited a little	No, not limited at all
a. <i>Vigorous</i> activities, such as running, lifting heavy objects, participating in strenuous sports.	1	2	3
b. <i>Moderate activities</i> , such as moving a table, pushing a vacuum cleaner, bowling, or playing golf.	1	2	3
c. Lifting or carrying groceries.	1	2	3
d. Climbing <i>several</i> flights of stairs.	1	2	3
e. Climbing <i>one</i> flight of stairs.	1	2	3
f. Bending, kneeling, or stooping.	1	2	3
g. Walking <i>more than one mile</i> .	1	2	3
h. Walking <i>several blocks</i> .	1	2	3
i. Walking <i>one block</i> .	1	2	3
j. Bathing or dressing yourself.	1	2	3

(McHorney et al., 1992)

SECTION 3: EVERYDAY ACTIVITIES

Please read each question carefully and circle the answer that comes closest to the way you have been feeling.

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
23. During the past 4 weeks, I have moved around my home as and when I have wanted.	5	4	3	2	1
24. During the past 4 weeks, I have moved around outside my home as and when I have wanted.	5	4	3	2	1
25. During the past 4 weeks, my self-care needs (eg washing, toileting, dressing, feeding, maintaining health) have been met, as and when I have wanted.	5	4	3	2	1
26. During the past 4 weeks, my home has been looked after, as and when I have wanted.	5	4	3	2	1
27. During the past 4 weeks, my things (belongings) have been looked after, as and when I have wanted.	5	4	3	2	1
28. Do you have any relatives, or other people, who depend on you? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, go to question 29.					
If yes, during the past 4 weeks, were these people looked after, as and when you have wanted?	5	4	3	2	1
29. During the past 4 weeks, I have met and spoken with other people, as and when I have wanted.	5	4	3	2	1

	All of the time	Most of the time	Some of the time	A little of the time	None of the time
30. During the past 4 weeks, I, or someone else on my behalf, have managed my money, as and when I have wanted.	5	4	3	2	1
31. Do you choose to take part in paid or voluntary work? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, go to question 32.					
If yes , during the past 4 weeks, have you taken part in paid or voluntary work, as and when you have wanted?	5	4	3	2	1
32. Do you choose to take part in education or training courses? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, go to question 33.					
If yes , during the past 4 weeks, have you taken part in education or training, as and when you have wanted?	5	4	3	2	1
33. Do you choose to take part in social activities? <input type="checkbox"/> Yes <input type="checkbox"/> No If no, go to question 34.					
If yes , during the past 4 weeks, have you taken part in social activities, as and when you have wanted?	5	4	3	2	1
34. During the past 4 weeks, have you participated in activities that are important to you, as and when you have wanted?	5	4	3	2	1

(Wilkie et al. 2005)

SECTION 4: SOCIAL SUPPORT

35. People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it?

	(Circle one number on each line)				
	None of the time	A little of the time	Some of the time	Most of the time	All of the time
a. Some one to help you if you were confined to bed.	1	2	3	4	5
b. Someone you can count on to listen to you when you need to talk.	1	2	3	4	5
c. Someone to give you good advice about a crisis.	1	2	3	4	5
d. Someone to take you to the doctor if you needed it.	1	2	3	4	5
e. Someone who shows you love and affection.	1	2	3	4	5
f. Someone to have a good time with.	1	2	3	4	5
g. Someone to give you information to help you understand a situation.	1	2	3	4	5
h. Someone to confide in or talk to about yourself or your problems.	1	2	3	4	5
i. Someone who hugs you.	1	2	3	4	5
j. Someone to get together with for relaxation.	1	2	3	4	5
k. Someone to prepare your meals if you were unable to do it yourself.	1	2	3	4	5
l. Someone whose advice you really want.	1	2	3	4	5

	(Circle one number on each line)				
	None of the time	A little of the time	Some of the time	Most of the time	All of the time
m. Someone to do things with to help you get your mind off things.	1	2	3	4	5
n. Someone to help with daily chores if you were sick.	1	2	3	4	5
o. Someone to share your most private worries and fears with.	1	2	3	4	5
p. Someone to turn to for suggestions about how to deal with a personal problem.	1	2	3	4	5
q. Someone to do something enjoyable with.	1	2	3	4	5
r. Someone who understands your problems.	1	2	3	4	5
s. Someone to love and make you feel wanted.	1	2	3	4	5

(Sherbourne & Stewart, 1991)

Next are some questions about the support that is available to you.

36. About how many close friends and close relatives do you have (people you feel at ease with and can talk to about what is on your mind)?

(enter number)

37. About how many close friends and close relatives live in your neighbourhood?

(enter number)

38. Do you have a spouse or partner? (circle one answer)

- a. Yes
- b. No

39. How many people, other than yourself, live in your household?

(enter number)

SECTION 5: HEALTH CONDITIONS

40. This section is about certain chronic health conditions which you may have. We are interested in 'long-term conditions' that have lasted or are expected to last 6 months or more and that have been **diagnosed by a health professional**. (circle one answer per question)

Do you have asthma?	Yes	No	Don't know
Do you have fibromyalgia?	Yes	No	Don't know
Do you have arthritis or rheumatism, excluding fibromyalgia?	Yes	No	Don't know
What kind of arthritis do you have? a. Rheumatoid arthritis b. Osteoarthritis c. Other – Please specify:			
Do you have back problems, excluding fibromyalgia and arthritis?	Yes	No	Don't know
Do you have high blood pressure?	Yes	No	Don't know
Do you have migraine headaches?	Yes	No	Don't know
Do you have chronic bronchitis?	Yes	No	Don't know
Do you have emphysema or chronic obstructive pulmonary disease (COPD)?	Yes	No	Don't know
Do you have diabetes?	Yes	No	Don't know
Do you have epilepsy?	Yes	No	Don't know
Do you have heart disease?	Yes	No	Don't know

Have you ever had a heart attack (damage to the heart muscle)?	Yes	No	Don't know
Do you currently have angina (chest pain, chest tightness)?	Yes	No	Don't know
Do you currently have congestive heart failure (inadequate heart beat, fluid build-up in the lungs or legs)?	Yes	No	Don't know
Do you have cancer?	Yes	No	Don't know
What type of cancer do you have? Circle all that apply. a. Breast b. Prostate c. Colorectal d. Skin - Melanoma e. Skin - Non-melanoma f. Other – Please specify:			
Do you suffer from the effects of a stroke?	Yes	No	Don't know
Do you have glaucoma?	Yes	No	Don't know
Do you have cataracts?	Yes	No	Don't know
Do you have Parkinson's disease?	Yes	No	Don't know
Do you have multiple sclerosis?	Yes	No	Don't know
Do you have chronic fatigue syndrome?	Yes	No	Don't know
Do you have another chronic disease or condition? a. Yes (Please specify): _____ b. No			

SECTION 7: YOUR FEELINGS

41. Below is a list of the ways you might have felt or behaved. Please mark how often you felt this way during the past week.

During the past week:	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of the time (3-4 days)	Most or all of the time (5-7 days)
a. I was bothered by things that usually don't bother me.	0	1	2	3
b. I had trouble keeping my mind on what I was doing.	0	1	2	3
c. I felt depressed.	0	1	2	3
d. I felt that everything I did was an effort.	0	1	2	3
e. I felt hopeful about the future.	0	1	2	3
f. I felt fearful.	0	1	2	3
g. My sleep was restless.	0	1	2	3
h. I was happy.	0	1	2	3
i. I felt lonely.	0	1	2	3
j. I could not get going.	0	1	2	3

(CESD-10, Andresen et al., 1994)

SECTION 6: BACKGROUND INFORMATION ABOUT YOU

- 42. What is your age? (enter years) _____

- 43. What is your gender?
 - a. Male
 - b. Female

- 44. What is the highest level of education you have achieved? (circle one answer)
 - a. Some highschool
 - b. Completed highschool
 - c. Some college/university or trade school
 - d. Completed trade school
 - e. Completed college
 - f. Completed university
 - g. Master's or doctoral degree

- 45. What category does your household income fall into? (circle one answer)
 - a. Less than \$20,000 per year.
 - b. \$20,000 to 29, 000 per year.
 - c. \$30,000 to 39,000 per year.
 - d. \$40,000 to 49,000 per year.
 - e. \$50,000 to 59,000 per year.
 - f. \$60,000 to 69,000 per year.
 - g. \$70,000 to 79,000 per year.
 - h. \$80, 000 or more per year.

- 46. What is your postal code?

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Thank you for the time and effort you have taken to complete this survey. Please return your completed questionnaire and one consent form in the postage paid envelope as soon as possible. If you have misplaced the envelope, please return this questionnaire and one consent form to:
Carri Hand
IAHS 403, McMaster University
1400 Main St. W., Hamilton, ON, L8S 1C7