Researching reducing health disparities: Mixed-methods approaches

Miriam Stewart a, Edward Makwarimba b, Alison Barnfather b,*, Nicole Letourneau c, Anne Neufeld a

a University of Alberta, Edmonton, Alberta, Canada
b Social Support Research Program, University of Alberta, # 5-22 University Terrace, 8303-112 Street, Edmonton, Alberta, Canada T6G 2T4
c University of New Brunswick, Saint John, New Brunswick, Canada

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Abstract

There is a pressing need for assessment and intervention research focused on reducing health disparities. In our research program, the use of mixed methods has enhanced assessment of the mediating impacts of social support on the health of vulnerable populations and enabled the design and testing of support interventions. This paper highlights the benefits and challenges of mixed methods for investigating inequities; and, illustrates the application of mixed methods in two exemplar studies focused on vulnerable populations in Canada. Qualitative methods fostered in-depth understanding of vulnerable populations’ support needs, support resources, intervention preferences, and satisfaction with intervention strategies and impacts. Quantitative methods documented the effectiveness and outcomes of intervention strategies, and enhanced the reliability and validity of assessments and interventions. The researchers demonstrate that participatory strategies are needed to make studies more relevant to reducing health disparities, contextually appropriate, and empowering.

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Introduction

Disparities in health and access to care across income or other population groups persist within many countries (OECD, 2003). Concerns about poverty and economic disadvantages are increasing in Canada (Séguin & Divay, 2002), Britain (Pantazis, Gordon, & Levitas, 2006) and other countries (Santana, 2002). Despite Canada’s high living standard and a health system promising universal access to care, disparities in health remain a pressing national concern. Vulnerable groups (e.g., the poor, women caregivers) suffer a burden of illness and distress greater than other residents. Income inequality is increasing and the 14.4% of Canadians who live in deep poverty experience higher rates of morbidity and mortality (National Council of Welfare, 2004). Unpaid family caregivers (primarily women)
are at risk for compromised health arising from gender influences and inequities. Research is required to document inequities; elucidate the mechanisms that produce inequities; and design and test interventions that reduce inequities (Beiser & Stewart, 2005).

Investigation of the complex linkages among health determinants in the context of vulnerable populations demands transformative and flexible methodological strategies (Dean & Hunter, 1996; Hviding, 2003). This approach to research crosses “traditional” scientific paradigms, which in the 1980s were thought to be incommensurable (Hugentobler, Israel, & Schurman, 1992; Moccia, 1988). A full discussion of philosophical positions or paradigms that influence research approaches is outside the scope of this paper; many texts are devoted to the topic (e.g., Crotty, 1998; Guba, 1990). The postpositivistic paradigm addresses the multidimensional complexity of social reality through multiple methods (Fischer, 1998; Phillips, 1990) and calls for participatory practices (Schulze, 2003).

For this paper focusing on mixed methods, inequities illustrate complex issues that require mixed methods to investigate and intervene. The strengths and challenges of mixed methods will be illustrated through two specific studies in our research program. These studies also demonstrate the use of participatory approaches as a key characteristic of research focused on reducing inequities experienced by vulnerable populations.

**Mixed methods**

‘Multiple methods’ and ‘mixed methods’ are often used interchangeably in the literature (e.g., Hugentobler et al., 1992). We will use ‘mixed methods’ throughout this paper. Mixed methods are an umbrella term encompassing multifaceted procedures that combine and synthesize methods (Creswell, Plano Clark, Gutmann, Hanson, 2003; Tashakkori & Teddlie, 2003), or triangulate methods. Triangulation is premised on the reasoning that no single method ever adequately solves the problem of rival explanations (Patton, 1999), and that the weakness in each single method will be compensated by the counter-balancing strengths of another (Jick, in Hugentobler et al., 1992). Mixed-method designs include both qualitative and quantitative methods in (1) parallel form (concurrent model), (2) sequential form (one type of data provides a basis for collection of another type of data), and (3) transformative form (either sequential or concurrent, but has an overarching perspective, such as transforming the lives of vulnerable groups (Creswell, 2003; Miller & Fredericks, 2006).

When methods are mixed in complementary ways, benefits include: converging or corroborating findings; minimizing alternative explanations for conclusions drawn from research data; elucidating divergent aspects of a phenomenon (Johnson & Turner, 2003); and obtaining a more accurate and comprehensive perspective of participants’ experiences (Coyle & Williams, 2000; Tashakkori & Teddlie, 2003). Varied methods can reciprocally extend and inform each other (Langhout, 2003); capitalize on the strengths of each method (Coyle & Williams, 2000; Creswell, 2003; Langhout, 2003); encompass the breadth, depth, and richness of social and health phenomena (Schulze, 2003); yield stronger inferences (Tashakkori & Teddlie, 2003); and expand the scope of a study (Morse & Chung, 2003). Mixed methods are also keys to illuminating complex research problems (Branigan, 2003; Creswell, 2003) such as health disparities. Mixed methods can serve a transformative purpose for vulnerable populations, including ethnic minorities and those who are poor or face gender inequities (Beiser & Stewart, 2005; Creswell, 2003), when they emphasize participation of the public, as well as program planners, service providers, and policy influencers.

The foremost challenge of mixed methods is the delineation of qualitative research questions and quantitative questions/hypotheses which are complementary and improve rigor. Other challenges include extensive data collection; time-intensive analysis of both text and numeric data (Creswell, 2003); decisions regarding which research methods to combine; and combination and interpretation of data (Khunti, 1999). These challenges necessitate comprehensive methodological training and interdisciplinary collaboration (Hviding, 2003).

**Mixed-methods approaches: exemplar studies**

We have conducted over 30 studies on social support as a determinant of health for vulnerable populations using mixed methods. The investigations are designed to (1) assess mechanisms by which social support exerts an impact on health status, health behaviour, and health services use; (2) investigate links between social support and other health determinants, specifically socioeconomic status, culture, and gender; and (3) design and test support interventions for vulnerable populations which can inform practice, programs and policies that reduce inequities.

Interdisciplinary teams of investigators, representing public health, nursing, anthropology, sociology, education, rehabilitation, psychology and medicine, guide the selection of methods and measures. Reflecting
principles of participatory research (Hills & Mullett, 2000), significant input is sought from stakeholders in public, program, practice and policy domains on the research process; and community advisory committees guide the design and implementation of the study, interpretation of results, and communication of findings. Moreover, the perspectives of participants on support needs, resources, and preferences are emphasized. Qualitative findings are shared with participants as a validity check. Ongoing communication with stakeholders helps to ensure transparency, critical dialogue, and rigor. Finally, findings are disseminated widely to diverse audiences, to enable critique of research approaches and results.

Most phenomena studied reflect sensitive situations and complex life contexts experienced by vulnerable groups. As qualitative techniques are considered appropriate for studying sensitive and unexplored issues (Creswell, 2003), vulnerable people facing inequities are interviewed individually or in groups. In some of our studies, insights from these data then inform the design of quantitative instruments which are more sensitive to respondents’ meanings and interpretations (Coyle & Williams, 2000). The exemplar studies illustrate how we collect ‘objective’ data by employing quantitative approaches in experimental designs (e.g., intervention research) and non-experimental designs (e.g., surveys). We employ quantitative measurements to represent the ‘structural’ features of social life; elicit distinctions among pertinent variables; extend, refine, and cross-check qualitative knowledge (Coyle & Williams, 2000); and “generalize” from the sample to similar vulnerable groups (Creswell, 2003; Schulze, 2003).

In each study, steps taken to address ethical issues included informed consent (e.g., possible benefits, risks), voluntary participation, right to withdraw, protection of confidentiality and anonymity, and reports of aggregated data and anonymous quotes.

Exemplar Study I: Perspectives on social exclusion and social isolation in low-income populations

In Canada, adults living in poverty are more likely to describe their health as poor or fair, and to experience sleep difficulty, lower life expectancy, functional limitations, disability days, chronic health conditions (e.g., asthma, stroke), and vision, mobility, and cognitive challenges than adults in higher-income categories (Canadian Council on Social Development, 2000; Wilkins, Berthelot, & Ng, 2002). The groups most likely to experience poverty are unattached female seniors, single parent mothers, children (National Council on Welfare, 2002), recent immigrants, indigenous people, and people with disabilities (Lee, 2000). The purpose of this assessment study was to examine the impact of socio-economic status on key dimensions of social cohesion (social exclusion/inclusion and isolation/belonging) and their relationship with health, from the perspectives of both low-income and higher-income people.

Methods

In this sequential mixed-methods design (qualitative → quantitative → qualitative) incorporating elements of transformative design (i.e. community participation), qualitative methods were employed in individual and group interviews (Phase I) because key dimensions of isolation/belonging and inclusion/exclusion, as influenced by socio-economic status, and their relationships with health were unexplored in previous research. Responses from these initial interviews were used to guide item development for most of Phase II survey questions. For example, six items were designed to elicit participants’ level of satisfaction with their neighbourhood infrastructure (e.g., shopping facilities, community agencies, housing, transportation), cited as major concerns in low-income participants’ narratives in Phase I. More specifically, key challenges preventing people from participating in activities (i.e. ‘enough money’, ‘lack of time’, ‘feeling unwelcome at events’) identified in Phase I interviews, prompted us to develop three items (e.g., “People with low incomes do not have enough money to participate in community events and recreational activities”) in the follow-up survey measure. Some items in the Phase II survey were informed by standardized measures of self-rated health and quality of life. Group interviews (qualitative methods) were used in the third phase to provide a platform for in-depth discussion of the implications of findings from the initial two phases for practice, programs, and policies. Guiding questions were informed by both Phase I (qualitative) and Phase II (quantitative) findings, consistent with the sequential mixed-methods approach (Creswell, 2003). To illustrate, after presentation of the summary of Phases I and II findings, participants were asked: “How do these findings ‘fit’ with your experiences and knowledge of people living on low incomes?”

Sample selection and data collection

Participants were drawn from eight neighbourhoods in the urban centres of Toronto, Ontario and Edmonton,
Alberta, Canada. The eight neighbourhoods were selected on the basis of (1) economic prosperity, in order to contrast wealthy and poor places and (2) variability in the degree of economic heterogeneity (in order to contrast homogenous places with those where different income groups co-exist).

In Phase I, purposive sampling (qualitative technique) was used to select participants representing varied low-income situations (e.g., working poor, social assistance recipients, unemployed, homeless), as well as high-income situations, and key demographic characteristics (i.e. gender, ethnicity, age) that may influence exclusion and isolation. Statistics Canada’s (2001) low-income cut-offs were used to determine poverty status. First, individual face-to-face interviews (n = 119) were conducted with low-income and higher-income people using qualitative semi-structured interview guides. Guides were pilot tested with low-income (n = 5) and higher-income (n = 5) people. Second, group interviews with other low-income people (n = 34) not included in the individual interviews provided an opportunity to expand the breadth of the qualitative data beyond the depth of the individual interviews. Interviews were tape-recorded and then transcribed verbatim for qualitative analysis.

Phase II participants were English-speaking adult respondents in the two cities. A two-stage probability process was used: (1) selection of households by randomly choosing telephone numbers using postal code data and (2) random selection of respondents within these households. We conducted telephone interviews (n = 1671) (using modified random digit dialling), rather than face-to-face interviews to ensure greater access and increase the representativeness of the sample. The conservatively estimated response rate (defined as the number of completed interviews divided by the estimated number of eligible households) was 58%. The 110 item survey instrument was constructed by the investigators using relevant subscales from validated measures (i.e. Social Support Questionnaire, Social Provisions Scale, Arizona Social Support Interview Schedule, UCLA Loneliness Scale, and Norbeck Social Support Questionnaire) as well as items developed by the interdisciplinary research team based on Phase I qualitative findings. The survey measure was pilot tested with 20 respondents.

In Phase III, two group interviews, one in each city, were conducted with policy influencers (n = 23). In addition, one interview was held by teleconference with policy makers and program planners from across Canada. Purposive sampling was used to ensure representation from health and health-related (e.g., recreation, employment, housing, poverty, social justice) sectors. Key findings from the first two phases were communicated to participants prior to these group interviews which focused on implications of findings for practice, programs, and policies; and communication strategies and audiences.

**Data analysis**

Phase I qualitative data from the taped and transcribed interviews were subjected to thematic content analysis. The investigators developed a coding framework to review these qualitative data. The framework, derived from the themes and sub-themes emerging in the interviews, was revised with consensus among team members as coding progressed. The categories in the framework met specific criteria: inclusive (i.e. reflected range of content in data), useful (i.e. meaningfully connected to data), mutually exclusive (i.e. separate and independent), clear and specific (Berg, 2001). Reliability checks between coders conducted throughout the coding process to reduce systematic bias achieved inter-rater reliability of 81%, reflecting ‘analyst triangulation’ (Patton, 1999). The responses of low-income and higher-income people were compared. Differences and commonalities among sub-groups of the sample, based on demographic characteristics, were noted. Common descriptors of isolation/belonging, exclusion/inclusion, and prevalent influencing factors were identified to inform the design of survey items in Phase II.

Phase II descriptive statistics were performed for selected survey items and for scales and indices created from survey items. The overall score for each variable, as well as the breakdown of each variable by place (city) and income were determined. Strength of association and statistically significant differences by city, income, and poverty status were determined using appropriate statistical tests: (1) chi-square and Cramer’s V when the two variables were categorical; (2) one-way ANOVA and eta when one was continuous and the other categorical; and (3) Spearman’s rho when both variables were at least ordinal. Multivariate linear and logistic regressions were used to assess the effects of basic demographic and socio-economic variables (e.g., age, gender, education, income), after controlling for one another, on the dependent variables of interest (i.e. measures of exclusion, inclusion, isolation, belonging). Data checks were performed and the data were cleaned.

Phase III thematic content analysis of the qualitative data elicited through group interviews with policy influencers was organized according to (1) congruence of
findings with professional experiences and (2) implications for programs, practices, and policies in health and health-related sectors.

**Key findings**

Qualitative data (Phase I) revealed that low-income people experienced more exclusion and isolation and less belonging than higher-income people because of poor health, material deprivation, inability to participate in activities, service fees, and excluding behaviours. Structural (e.g., prejudice and discrimination, inaccessibility of amenities/services and bureaucracy) and interpersonal factors (e.g., social distancing or avoidance, unwelcoming behaviours, and enacted stigma) shaped low-income people’s experiences of exclusion and isolation. Low-income participants’ experiences of exclusion and isolation (Phase I) matched policy influencers’ (Phase III) professional understanding of the exclusion and isolation faced by people living in poverty. According to the quantitative data (Phase II), income was a consistent predictor of measures of isolation and belonging, and of inclusion and exclusion, even when controlling for other relevant variables.

**Insights from mixed methods**

The mixture or sequential use of qualitative (individual and group interviews of low- and higher-income people) and quantitative (survey of low- and higher-income people) methods, followed by qualitative methods (group interviews of policy makers), yielded credible and comprehensive data demonstrating the same pattern of effect of income on exclusion/inclusion, isolation/belonging, and health. Quantitative data helped to generalize findings from the qualitative phases to a wider population of vulnerable people. The richness of the data reinforces the value of using mixed methods triangulating multiple sources (e.g., low-income people, higher-income people, service providers and managers, policy influencers) of data. The richness of mixed-method findings was also reflected in the general consensus among participants across the three phases, that governments should make more public investments in community programs to reduce disparities by countering poverty. Further, while most survey respondents agreed with structural explanations of poverty (e.g., government policies and unequal opportunities), qualitative data provided further clarification regarding structural attributions of poverty, emphasizing government policies that cause restrictive market situations (e.g., low minimum wage, lack of full-time jobs).

Qualitative and quantitative findings converged on many fronts. Qualitative findings revealed that participation fostered sense of belonging, self-efficacy, and emotional, social, and physical well-being, while quantitative findings indicated that participation enhanced health. Convergence between the two methods emerged in the negative perceptions some low-income people hold about other poor people. Qualitative data revealed that some low-income people (particularly those not receiving welfare) viewed people receiving welfare as abusers of the system, creating problems for those “who really needed help”. Survey respondents living below the poverty line were slightly more likely than higher-income respondents to believe that governments were spending too much on social programs, for low-income people.

Divergent and unexpected findings also emerged. For example, qualitative data identified lack of financial resources as a primary barrier. In contrast, in structured survey questions with forced choice answers, both high- and low-income respondents selected ‘lack of time’ as the major barrier for their participation. They also identified ‘lack of time’ as a reason why low-income people don’t participate.

Phase I qualitative data contributed some new knowledge that Phase II quantitative data did not, and vice versa. For example, qualitative findings added breadth and depth to the knowledge about reasons for non-participation in activities, and causes of poverty not captured by survey questions. The narratives linked individual reasons with structural and socio-cultural causes of poverty. Complex interactions among other contributing factors were uncovered through these qualitative data. For example, lack of education, a commonly mentioned factor across income groups, was linked to inability to access good jobs. Moreover, previous abuse was connected to poverty.

Most participants across phases agreed on the merits of tackling the causes of poverty and determinants of poverty rather than its effects. Inclusion of perspectives across the income divide, and from public, policy, and program domains, in this mixture of qualitative, quantitative, and participatory approaches, lends credence to the findings and provides more comprehensive information for the design of programs and policies.

**Limitations**

As interviews across phases were conducted in English, the study population may not represent immigrants and racial minorities. The telephone survey might have also failed to reach some people without
landline telephones. Despite these limitations, the simultaneous use of quantitative and qualitative data across two sites and across homogeneous and heterogeneous income neighbourhoods enabled generalizations (to other urban centres), and illuminated the relationship between socio-economic status and social relational factors.

Exemplar Study II: Telephone support for family caregivers of seniors with chronic conditions

Older persons are most likely to suffer from chronic health conditions that restrict their activities (Rosenberg & Moore, 1997). Most people living with chronic conditions and most elderly are supported by family members (Canadian Study of Health and Aging Working Group, 2000). However, family caregivers of elderly persons with chronic conditions are vulnerable to negative mental and physical health outcomes (Pruchno, Kleban, Michaels, & Dempsey, 1990); and, access more health care services (Schulz, O’Brien, Bookwala, & Fleissner, 1995). Consequently, their support needs are extensive at a time when their support resources are diminished (Yin, Zhou, & Bashford, 2002). In this intervention study, partnerships of peers and professionals were created to supplement the depleted social networks of family caregivers. Support interventions that seek to introduce new ties are most valuable when the existing social network is impoverished, drained, or lacks experiential knowledge (Cohen, Underwood, & Gottlieb, 2000).

Accordingly, the purpose of this study, conducted in two major urban centres of Alberta (each with a population of over 1,000,000 people) was to design and test a telephone support intervention for family caregivers of seniors with stroke or Alzheimer’s Disease.

Method

In this study, a concurrent mixed-methods design (quantitative ↔ qualitative) was used in combination with a transformative design (i.e. community participation). Quantitative data were collected at three time points (pre-test, post-test, and delayed post-test 3 months later) on the intervention impact and outcomes, through standardized instruments. Qualitative data were collected during and after the intervention on intervention processes. Intervention processes are typically not explicated or evaluated in reported research impeding replication and adaptation in future studies (Gottlieb, 2000). Participants’ perceived impacts and satisfaction with the intervention were also determined through qualitative methods, as participants are rarely invited to identify valued outcomes and perceptions of interventions (Gottlieb, 2000).

Sample selection and data collection

Vulnerable new family caregivers of seniors with stroke or Alzheimer’s (n = 128) were randomly allocated into intervention (n = 66) or control (n = 62) conditions. “New” family caregiver referred to a recent diagnosis for stroke survivor, and to either a recent diagnosis or a recent problematic change in Alzheimer’s disease.

Caregivers in the intervention condition received weekly telephone contact from peer helpers over a period of 20 sessions, each lasting as long as the caregiver wished (15—60 min). Peer helpers offered new family caregivers three types of social support during telephone discussions: information (e.g., stage of illness, community services), affirmation (e.g., advice, positive reinforcement), and emotional (e.g., empathy, listening). Professionals gave information or advice to peer helpers on diverse issues. Accessibility was a key element in the design of this intervention. Family caregivers assigned to the intervention condition took approximately 9 months to complete the study protocol.

Qualitative data were elicited through five mechanisms. First, interviews conducted with participants before and after the intervention were audio-taped and transcribed. Qualitative interviews conducted before the intervention included questions on family caregivers’ experiences of support (helpful and non-helpful). Following the intervention and 3 months later, interviews assessed the perceived impact of the support intervention on support needs, interactions with social networks, loneliness, caregiving burden, coping strategies, and use of health services. Second, intervention agents (peer helpers, health professionals) completed field notes to document intervention processes. Third, all telephone discussions between peer helpers and family caregivers (participants) were audio-taped and transcribed to elucidate types of support provided, issues discussed, and intervention processes. Fourth, exit interviews with intervention agents on the intervention impacts, benefits, and challenges; training and resource materials; and support provided to participants were audio-taped and transcribed. Fifth, monthly ‘check-in’ sessions engaging project staff and peer and professional intervention agents were audio-taped and transcribed. During these teleconference meetings, support strategies, successes and challenges were shared. Quantitative data were derived from the administration of five standardized instruments (Perceived
Caregiving Competence Scale, Caregiving Burden Inventory, Emotional/Social Loneliness Inventory, Arizona Social Support Interview Schedule, Health Services Utilization Inventory) to measure potential outcomes: caregiving competence, caregiving burden, loneliness, support satisfaction, and health services use.

Data analysis

Qualitative data analytic techniques were employed to provide in-depth elaboration and substantiation of quantitative results. Pre-test interviews of participants were analyzed for support intervention preferences, and post-test and delayed post-test interviews of participants and peer facilitators were analyzed for satisfaction with the intervention, perceived impacts, influencing factors, and recommended changes. Transcribed intervention discussions and facilitators’ field notes were analyzed for intervention processes, support provided, and influencing factors. Deductive content analysis was used to analyze sources, types, and appraisal of support, and loneliness/isolation. Inductive content analysis was used to analyze the discussion themes, nature of supportive interactions, and mediating processes. The investigators developed a coding framework for the qualitative data. N6™ software was used to sort data and to facilitate thematic content analysis. The categories in the framework met specific criteria (Berg, 2001) outlined previously. Rigor was achieved through data saturation, an audit trail, and multiple sources of data.

Quantitative data were cleaned and screened for outliers and errors before calculating descriptive and advanced statistics. Chi-square tests and t-tests were used where appropriate to assess differences between control and intervention groups. Chi-square tables with greater than four categories were only combined if the categories were considered meaningful. Numeric normally distributed data with equal variances were analyzed with two-way repeated measures ANOVAs (Group × Illness), repeated on time. Only participants who completed pre-, post-, and delayed post-intervention questionnaires were included in the repeated measures ANOVA analyses. This test was used to determine if differences existed between pre-intervention, post-intervention, and delayed post-intervention means. For time-based differences, the contrast procedure following the General Linear Models guidelines in SAS was used.

Key findings

Qualitative data from interviews of participants and intervention agents indicated that family caregivers benefited from, and were satisfied with, the forms of support (i.e. information, affirmation, emotional) provided by peer helpers. According to qualitative data from intervention agents’ field notes and transcriptions of the taped telephone support sessions, three mediating intervention processes—social comparison, social exchange, social learning—were evident.

In the interviews following the intervention, approximately half of the caregivers revealed that the intervention enhanced their competence, confidence, coping, and ability to handle caregiving responsibilities. The majority of caregivers in the intervention condition expressed satisfaction with information received. Participants reported that their support needs were met through the intervention. Caregivers also highlighted the importance of their interactions with the peer helpers in diminishing loneliness. Finally, decreased caregiving burden was credited to the support intervention.

The qualitative interviews revealed perceived impacts that aligned with the outcome measures (e.g., decreased loneliness). Although there were encouraging trends, there were no significant differences between the intervention and control conditions on the five standardized measures of caregiving competence, caregiving burden, loneliness, social support, and health services use. Perhaps the standardized measures were not sensitive to outcomes in community-based psychosocial interventions for family caregivers.

Insights from mixed methods

The qualitative data elucidated intervention processes in the telephone support dyads; explicated perceived impacts of the support intervention; and identified key characteristics of the peer-professional relationship and mechanisms for developing partnerships. Qualitative findings pertaining to intervention processes were delineated to enable explication and evaluation. Moreover, participants’ satisfaction and perceptions of the intervention’s impact give them an opportunity to identify valued outcomes of the intervention. Gottlieb (2000, p. 307) stated that “it is not reasonable to expect caregivers to come away from support programs feeling less sadness about their relatives or feeling less anxious about their future, because these feelings are normal reactions to their chronically stressful circumstances.” In the same vein, it may not be possible to discern statistically significant findings in standardized measures of caregiving competence or burden given the complexity and diversity of caregivers’ situations. It may be a more realistic outcome.
for family caregivers to have these feelings validated, normalized, and accepted as accomplished in this peer support intervention. Clearly, the qualitative data revealed perceived impacts on caregiver burden, loneliness, and support needs not illuminated through the quantitative measures.

Qualitative and quantitative findings converged on some themes. For example, caregivers reported satisfaction with various forms of support (i.e. information, affirmation, emotional) available through the intervention. The bulk of their satisfaction was related to informational support. Caregivers also reported increased satisfaction with emotional and affirmation support including: empathy received from their peer helpers; feelings of relaxation, encouragement, and importance; enjoyment and friendship; self-esteem building; an “outsider” who understood; and having someone to talk to so they didn’t feel lonely. According to quantitative data, although not significant when compared to the control condition, support satisfaction increased in the intervention condition group. Overall, support satisfaction did not decrease over time.

Quantitative and qualitative findings also produced divergent findings. Approximately half of the caregivers revealed that the intervention increased their feelings of competence and confidence in caregiving due to the affirmation support from peer helpers, which validated their actions and reactions, making them feel that they were “on the right track.” This support was vital, given that many new caregivers were uncertain of their decisions and feelings. Enhanced caregiver competence was also attributed to the informational support provided by peer helpers. These caregivers acquired new information on how to manage difficult caregiving situations effectively. They also disclosed that they were more willing to take initiative and to solicit help, as a result of the peer support. However, ANOVA testing for competence and self-confidence were not significant. Caregivers of stroke survivors reported higher levels of competence and self-confidence overall, compared to caregivers of seniors with Alzheimer’s’ ($F = 1.22$, $p = 0.27$, illness effect). There was also a notable difference in the Time x Group x Illness interaction for caregivers of stroke survivors in revealing increased competence and self-confidence over time ($F = 1.95$, $p = 0.15$). This effect occurred in the intervention group only.

**Limitations**

A major limitation of this study is the small sample size, particularly in the type of quantitative tests required. One of the drawbacks of a repeated measures design is the fact that a missing value for any of the variables at any time point could result in a subject’s exclusion from the analysis. This causes two major problems: (1) subjects with missing values may differ systematically from those with complete data and (2) a subsequent decrease in power to detect differences. The first challenge was managed by examining the demographic characteristics of subjects with missing values. There were no appreciable differences in subjects with missing information and therefore their exclusion would not have altered the findings considerably. The second challenge cannot be overcome easily. The study’s original intention was to combine Alzheimer’s and stroke caregiver data in an effort to obtain the sample size and power necessary to detect changes. Unexpected differences were observed between the two illness groups that made combination problematic. The statistical power resulting from sample size in this study is of vital importance in the evaluation of findings. The reduced sample size did not permit the power to detect small increases or decreases in the measured characteristics. It is important to emphasize that the effect sizes observed were much lower than the literature originally indicated. Sample size calculations were based on the literature, and these factors could not have been foreseen. In addition, the necessity to evaluate illness groups separately reduced the power further.

Despite these limitations, the mixed methods employed in this intervention study generated useful insights about the experiences of caregivers and support intervention processes and impacts. This intervention clearly demonstrated a difference between the caregivers of seniors with Alzheimer’s and caregivers of seniors with stroke, which can inform future research. Qualitative data offered strong insights into the experiences of caregivers and perceived impacts of the support intervention, despite the lack of statistical significance. For these reasons, we would replicate this intervention but increase sample size and study illness groups separately.

**Discussion**

Complementary and reciprocal qualitative and quantitative strategies were used in these exemplar studies and other studies conducted in our research program. Qualitative and quantitative methods collectively helped document vulnerable populations’ unmet support needs, support-seeking strategies, and preferences for health-related supports. “Simultaneous or
Unique achievements of mixed methodsa

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<th>Specific link to two case studies</th>
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<tr>
<td>1. Providing a holistic picture</td>
<td>Mixed methods of both studies, resulting in a synergistic effect, because the outcomes of the combinations or &quot;emic&quot; experiences and &quot;etic&quot; perspectives were greater than would have been achieved by either used separately</td>
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<td>2. Analysis of one method (quantitative or qualitative) guides the other</td>
<td>In the sequential model of Exemplar Study I, qualitative results from Phase I were used to construct survey items for Phase II; and conversely, Phase II findings were partly used to construct discussion questions for Phase III group interviews. In Exemplar Study II, quantitative findings (on support needs and resources and preferences for support) were used to construct semi-structured post- and delayed post-test questions on perceptions of the intervention’s impact and satisfaction with support</td>
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<td>3. Qualitative findings complement and provide context and explanation for quantitative results</td>
<td>In Phases I and III of Study I, qualitative findings/interpretations were used to provide context and meaning to Phase II quantitative findings. In Exemplar Study II, qualitative data illuminated intervention processes and perceived impacts and satisfaction, and quantitative data were used to illuminate intervention impacts and outcomes</td>
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<td>4. Quantitative comparison of outcome and baseline measures combined with participants’ perspectives</td>
<td>Quantitative comparison of pre-test (baseline) and post- and delayed post-test (outcome) measures, and obtaining the perspectives of participants and peer helpers using qualitative methods were key components of Study II</td>
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<td>5. Triangulation and cross-validation</td>
<td>In Study I, both qualitative and quantitative findings were used in the analysis and interpretation of experiences and perceptions of isolation/belonging and inclusion/exclusion. Findings from both methods provided the same/similar conclusions regarding causes of poverty and remedies</td>
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<td>6. Illumination of meaning</td>
<td>In Exemplar Study I, quantitative data was helpful in exploring the relationships between the main variables (exclusion, inclusion, isolation, belonging, social support, participation) and socio-demographics. Congruent with survey responses, many interview participants concurred that poverty is stressful, largely because of the constant struggle and uncertainty of ‘making ends meet’. In the concurrent mixed-method model of Exemplar Study II, quantitative data on intervention outcomes and qualitative data on perceived impacts and satisfaction with the intervention illuminated meanings</td>
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<td>7. Simultaneous (parallel) investigation → inference or meta-inference</td>
<td>Concurrent mixed-method design of Exemplar Study II fostered reciprocally simultaneous investigation of research questions (qualitative data) and testing of hypotheses (quantitative data), leading to conclusions (inference) about the effectiveness of the support intervention and furthering knowledge about social learning, social exchange, social networks, and social support theories (meta-inference)</td>
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<td>8. Analysis and presentation of complementary aspects of the same phenomenon</td>
<td>Qualitative and quantitative data in Exemplar Study I were complementary, investigating common phenomena. For example, in Phase I “sense of belonging and isolation” was tackled directly, asking: what they considered their community; if there was a place they felt they belonged; what made them feel they belonged; and who provided them with support during times they felt they belonged. In the survey, sense of belonging was tackled indirectly (eight items), focusing on social ties, for example asking respondents if they agreed or disagreed that ‘the world is basically a friendly place’, if ‘there are a few dependable ties between people anymore’, if they ‘felt alone in the world’</td>
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<td>9. Enhancing implementation of intervention programs</td>
<td>In Study II, mixed methods (qualitative, quantitative) enhanced the quality and scope of the support intervention, and provided a basis for comparative analysis. The participatory action element enhanced data source triangulation (i.e. perspectives of study participants, professional and peer facilitators, service providers and policy makers), and broadened the scope</td>
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<td>10. Strengthening evaluation of intervention programs (processes and outcomes)</td>
<td>Mixed methods (qualitative, quantitative and participatory action research) in Study II strengthened the assessment/evaluation of the support intervention structures, processes, and outcomes, thereby increasing the credibility of findings</td>
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<td>11. Foster critical reflection</td>
<td>Use of mixed methods in Studies I and II, particularly the participatory action strategy, enabled critical assessment/analysis and reflection</td>
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<td>12. Inform of rational policy and program recommendations</td>
<td>Study II included an evaluative phase that sought recommendations for policy, programs and practice from study participants and peer mentors, thereby enhancing the quality of implications for policies</td>
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a These unique contributions were obtained from the following sources: Coyle and Williams (2000); Hugentobler et al. (1992); Miller and Fredericks (2006); Morse and Field (1995); Patton (1999); Steckler, McElroy, Goodman, Bird, and McCormick (1992); Tashakkori and Teddlie (2003).
sequential triangulation of more than one...method or combining qualitative and quantitative methods provides a more balanced perspective” (Morse & Chung, 2003). The quantitative research strategies extended and refined qualitative evidence (Coyle & Williams, 2000) and elucidated distinctions and relationships among variables. Qualitative methods enabled documentation of the intervention processes (“black-box”) for replication and adaptation in future research with vulnerable populations.

Sale and Brazil (2004) conducted a critical appraisal of mixed methods and identified 64 criteria for evaluating quantitative and qualitative methods. Fifty-three of these criteria are addressed in the two exemplar studies. Unique benefits achieved by the mixed-methods models employed in the exemplar studies are outlined in Table 1. Challenges encountered in these studies are highlighted in Table 2.

Mixed methods generated knowledge about vulnerable peoples’ perspectives and experiences in these two}

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<th>Table 2</th>
<th>Challenges experienced in mixed-methods studies</th>
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<td>Challenges of mixed methods</td>
<td>Exemplar studies</td>
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<td>1. Time- and labour-intensive data collection (compounded by need for source and method triangulation) and data analysis (of both quantitative and qualitative data)</td>
<td>Data collection is particularly time and resource intensive in intervention studies because qualitative and quantitative data are collected concurrently at pre-, post- and delayed post-test. Both exemplar studies employed research assistants (with masters and PhD training) from diverse disciplines. Sufficient numbers of research assistants are hired in each site and trained in qualitative and quantitative methods to manage the demands of data collection</td>
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<td>2. Resource and time-intensive nature of participatory research</td>
<td>The creation of an advisory committee and the engagement of participants in informing the development and implementation of interventions is time intensive. Community advisory committees meet regularly to provide feedback on research instruments and ensure relevance of research procedures. Community partners play a key role in recruiting participants; connecting research teams with the right calibre of community research assistants and peer mentors; providing space for interviews and support group meetings; and, facilitating the dissemination of findings to the public, program planners, service providers, and policy influencers</td>
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<td>3. Sample sizes sufficient for qualitative methodologies are frequently insufficient for quantitative methodologies, thereby limiting the generalizability of the findings</td>
<td>Multisite studies help to increase sample size and statistical power. Pilot studies (e.g., Study II) lay the groundwork for larger randomized controlled trials. The qualitative data supplements enable the interpretation and clarification of the quantitative findings. Small sample sizes in qualitative methods facilitate the transferability of vulnerable populations’ experiences and lay the foundation for selecting relevant and acceptable quantitative approaches</td>
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<td>4. Social desirability bias can emerge from both qualitative and quantitative findings, leading to divergent conclusions requiring complex analyses</td>
<td>In both exemplar studies, to reduce social desirability bias we a. appeal to respondents/participants to answer honestly, b. promise and assure confidentiality/anonymity, c. ensure demonstrable anonymity by distancing interviewer from the interview by using telephone interviews (e.g., Study I), d. reduce interviewee-interviewer similarity by employing graduate research assistants.</td>
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<td>5. Combination and interpretation of data when questions from qualitative and quantitative methods focus on unrelated phenomena and, generate divergent findings</td>
<td>Studies benefit from the expertise of interdisciplinary teams with complementary ontological, epistemological, methodological backgrounds that facilitate a multidimensional understanding of research designs and mixed-methods model(s) to match to particular research problem(s) and social phenomena. Specific research questions are designed to elicit qualitative and quantitative data relevant to the support needs and support intervention preferences of vulnerable populations (e.g., low-income people, family caregivers, youth with disabilities, immigrants and refugees)</td>
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<td>6. Delineation of qualitative research questions and quantitative questions/hypotheses that are complementary and improve rigor in concurrent models</td>
<td>Teams work across sites and engage multiple disciplines in the review of qualitative and quantitative data, comparison of qualitative and quantitative data, and interpretation of qualitative and quantitative data</td>
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studies. Participants’ perceptions of intervention impacts and their satisfaction with the intervention, elicited through qualitative measures, bridged a reported gap in research. Participatory strategies (Heenan, 2004; Hugentobler et al., 1992) in these studies (e.g., employment of peer mentors, participants’ expressions of support needs and intervention preferences, partnerships with community organizations, community advisory committees, eliciting participants’ and policy influencers’ input on implications of findings) made these studies more relevant and contextually appropriate to reducing health disparities. Collaborative participatory research is a powerful tool for reducing health inequities (Baker, White, & Lighveld, 2001; Heenan, 2004), as it unlocks the energy and knowledge that exists in a community around a specific issue; and builds community capacity (Prevention Institute, 2006).

In summary, qualitative methods fostered in-depth understanding of experiences of living on low-incomes and strategies to facilitate inclusion/participation of low-income people (i.e. Exemplar Study I). Qualitative methods also generated detailed information on support needs, support resources, and intervention preferences from the perspective of vulnerable populations; and explicated their satisfaction with intervention strategies and impacts (Exemplar Study II). Quantitative methods documented the effectiveness and outcomes of intervention strategies and enhanced the reliability and validity of assessments and interventions, and generalizability of findings. The more abstract quantitative data were supplemented with concrete examples in vulnerable participants’ own words (i.e. qualitative data), reflecting people’s actual experiences. Such experiences provided invaluable experiential knowledge (Hviding, 2003). Participatory approaches promoted empowerment (Heenan, 2004); reduced distrust; expanded application of research knowledge; and engaged stakeholders, including vulnerable people and service providers, in the analysis and reduction of health disparities (Baker et al., 2001) in these studies.

As the exemplar studies reveal, mixed methods can be employed either in assessment or in intervention design and evaluation. Moreover, the combination of mixed methods in intervention research can help ensure that impacts elicited only through qualitative methods are considered in the selection of sensitive quantitative measures of outcomes in future studies. Thus, interventions of value from the perspective of vulnerable populations would undergo comprehensive evaluation of relevance and suitability as well as perceived importance and impact.

‘Methodological individualism’ (Schoenberger, 2001) would have ignored the multidimensional complexity of phenomena linked to inequalities (Fischer, 1998; Schulze, 2003) and support processes in both exemplar studies. Elimination of health disparities requires the assessment of disadvantaged groups’ perceptions about their situations, experiences, and recommendations prior to development of interventions. Eliminating health disparities also requires new knowledge generated by pilot interventions that inform the design of services, programs and policies and create innovative partnerships.

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References


