Published in final edited form as:

Rehabil Nurs. 2010 ; 35(4): 167–175.

Psychological Resilience and Depressive Symptoms in Older Adults Diagnosed with Post-polio Syndrome

Diana Pierini, RN, BSN [Doctoral Student] and
The University of Texas at Austin, School of Nursing, Austin, TX

Alexa Stuifbergen, PhD, RN, FAAN
Professor and Associate Dean of Research at The University of Texas at Austin, School of Nursing, Austin, TX

Abstract

Depression is a serious co-morbidity in persons with disability, yet few studies have focused on depressive symptoms in persons aging with post-polio syndrome (PPS). We used a resilience conceptual framework that focused on patient psychosocial strengths to investigate the relationship between psychological resilience factors (acceptance, self-efficacy, personal resources, interpersonal relationships, self-rated health, spiritual growth, and stress management) and depressive symptoms in a large sample ($n = 630$) of persons over age 65 who were diagnosed with PPS. A higher percentage (40%) of the sample scored ≥ 10 on the CES-D 10 than was previously cited in other studies; however, 53% of the sample had good or excellent self-rated health, suggesting psychological resilience. Depression scores were regressed on seven selected resilience factors after controlling for functional limitations. Four of the seven variables accounted for 30% of the variance in depressive symptoms with spiritual growth representing the main predictor ($\beta = -.26$). The implications for rehabilitation nurses in developing a patient-strengths perspective in the assessment and counseling of individuals aging with PPS are discussed.

A conservative estimate of the number of non-institutionalized polio survivors in the United States is approximately 426,000¹ (Becker, 2006). More than half of this group is over age 65, and because of advances in technology, they are expected to experience longevity that is similar to that of the non-disabled population. Post-polio syndrome (PPS) has been defined as a failure of oversized motor units that were created during the recovery process of paralytic poliomyelitis, which leads to an exacerbation of existing weakness, or development of new weakness or paralysis (National Institute of Neurological Disorders and Stroke, n.d.). Previous estimates place the incidence of PPS from 25% to 50% in polio survivors (Mayo Clinic, n.d.); however, Kling, Persson, and Gardulf (2000) predicted that this number would increase to 60-80% due to the risk factor of aging. One important health care problem for this group is that younger providers may not be familiar with effective management strategies for persons aging with PPS because acute polio infection is considered a disease of the past in developed countries (Halstead, 1994, as cited in Westbrook and McIlwain, 1996; March of Dimes, 2000). A renewed interest in research aimed at developing clinical psychotherapeutic counseling techniques that emphasize a “personal strengths” perspective (Greene, 2002) may help to ameliorate this situation.

Address correspondence to: dianapierini@mail.utexas.edu; 1700 Red River, Austin, TX 78701; Office: 512-475-8794; Fax: 512- 471-1571. .

¹This estimate was adjusted downward for mortality, but it does not account for new cases due to immigration or underreporting of cases, a known phenomenon in this illness.

Although research on aging issues continues to expand, few studies have focused on the mental health of persons aging with post-polio syndrome (PPS). It is generally accepted that depression-related morbidity and mortality rates are associated with significant personal suffering and substantially higher medical utilization in the general population (Unutzer et al., 1997; Kemp, 2006; Simon & VonKorff, 1995). However, the higher levels of depression in persons diagnosed with PPS (Kemp, Adams, & Campbell, 1997; Maynard, 1991; Stuifbergen, 2005; Westbrook & McIlwain, 1996) should compel health care providers to be knowledgeable and competent about the provision of mental health care for this subgroup.

Studies have shown that losses unique to the polio experience can combine with normal age-related losses to threaten the emotional well being of persons with PPS (Bruno, 1999; Halstead, 1998; Harrison & Stuifbergen, 2006; Westbrook & McIlwain, 1996). Clearly, not all persons facing the challenges of PPS experience depression. It is possible, however, that individual psychological strengths linked to resilience, including the way people view disability and their ability to manage stressors, as well as personal resources such as social support, may have a significant role in checking the development of depressive symptoms (Fredrickson, Tugade, Waugh, & Larkin, 2003; Lazarus & Folkman, 1984; McCubbin, 2001; Rutter, 2007). The purpose of this study was to determine if the resilience factors of acceptance, personal resources (social support), self-rated abilities for health practices (self-efficacy), interpersonal relationships, self-rated health, spiritual growth, and stress management were predictive of fewer depressive symptoms for a sample of persons diagnosed with PPS. Our research questions were: 1) What is the relationship between selected psychological resilience factors and depressive symptoms in older adults diagnosed with PPS? 2) Which factors best predict depressive symptoms for older persons with PPS, after controlling for age and functional limitations?

Post-polio Syndrome

Post-polio syndrome develops when new disease-related symptoms occur, or when there is an unusual increase in severity of residual symptoms from the initial illness (Mayo Clinic, n.d.). Risk factors for acquiring PPS include aging, being female, and having severe initial infection with permanent residual impairment (Ramaraj, 2007; Ramlow, Alexander, LaPorte, Kaufman, & Kuller, 1992). PPS may strike 10 to 50 years after the initial polio infection (Halstead, 1998; Ramaraj, 2007) and presents the polio survivor with the disappointment of an unexpected surge in physical deterioration. Symptoms may include extreme mental and physical fatigue, muscle and joint pains, new or increased muscle weakness or atrophy, difficulty swallowing, intolerance to cold, and occasionally, respiratory dysfunction (Westbrook, 1991). Depending on severity, these new symptoms are viewed by some as an unwanted hassle, and for others, an overwhelming stressor leading to fear, frustration, anger, and depression (Hallam, 2000; Halstead, 1998; Westbrook, 1991). For many, the onset of PPS demands a regrouping of coping skills for individuals who thought they had overcome their biggest polio-related hurdles.

Conceptual Framework

Psychological resilience² (PR) is a broad construct that represents a combination of positive traits and coping responses or behaviors that facilitate the successful management of unexpected changes or formidable stressors in one's life (Kobasa, Maddi, & Kahn, 1982; Rutter, 2007; Tugade & Frederickson, 2004; Wagnild & Young, 1990). Inherent in the broader framework of PR are multiple factors that include: 1) personal values and belief

²The definition posited here represents a synthesis of previous research and the first author's professional experience working with older adults.

systems (i.e., religion and spirituality); 2) personality traits (i.e., optimistic outlook and sense of humor); 3) behaviors (i.e., problem solving versus internalization of stress); and 4) interpersonal resources such as social support. Mental health outcomes are also affected by functional decline and environmental factors such as social climate. The combination of this complex interplay of factors makes it possible for certain individuals to survive and even thrive in the face of adversity (Connor & Davidson, 2003; Greene, 2002; Luthar, Cicchetti, & Becker, 2000; McCubbin, 2001). Rutter (2007) viewed resilience as a changing life *process*, the success of which depends on the situation and individual perception. McCubbin (2001) looked at resilience as an *outcome* variable, positing that coping skills, attitudes towards obstacles, cultural world-view, and environmental factors influence individual resilience. In this study, we view PR as a multifactorial patient strength that assists persons in coping with adversity, and thus, may *predict* lower levels of depressive symptoms. Because so many variables have been identified with PR, it is important to isolate those factors that are most salient to each population of study, in this case-persons with diagnosed PPS.

The development of Stress and Coping Theory preceded the study of PR, and was important to the broader construct of resilience (Lazarus & Folkman, 1984). Researchers have suggested that the success with which a person copes with age-related changes can affect depression and life satisfaction (Jang, Poon, & Martin, 2004; Kemp & Krause, 1999). Lazarus and Folkman proposed that coping with stressful changes is less about the number or nature of changes and more about the complex interplay of psychological factors, such as personal perceptions of change, personality traits, level of social support, and coping methods used. Tugade and Frederickson (2004) emphasized the role of positive emotions in coping and resilience. Sanchez (1997) found that persons with PPS who used a problem-focused coping style in dealing with life stressors had fewer depressive symptoms. Thus, methods of coping are woven into the fabric of PR. A well-accepted theory of resilience for older populations has not been formulated at this time; therefore, we used the construct of resilience as a conceptual guide for the study.

Background

Depression has recently been cited as the top cause of medical disability in the U.S., costing \$53 billion annually (Insel, 2007). The prevalence of depression for the non-disabled aging population is 8-20% (U.S. Department of Health and Human Services, 1999), whereas Kemp (2006) reported that for persons with disability the rate is 25-50%. Although disability is associated with higher risk for depression, few studies focus on depression or depressive symptoms in persons aging with PPS. For example, in a search of Medline, PsychINFO, and CINAHL-Plus databases from 2000 to 2008 using the keywords “post-polio syndrome” and “depression,” only two studies were retrieved that focused on depression in persons with PPS. Weber, Schonknecht, Pilz, and Storch-Hagenlaöcher (2004) assessed 15 PPS patients for depression using the ICD-10 criteria and found that depressive episodes were recognized in eight of the 15 patients (53%). Wenneberg and Ahlström (2000) completed qualitative interviews with 15 individuals who reported that current complications of living with PPS revived past painful memories of prejudice and mistreatment. Sample sizes were notably small in these studies. However, more recently, Stuitbergen (2005) identified secondary conditions in a large sample of polio survivors ($n = 2,153$) and found a sizeable difference between reports of physician diagnosed depression (32%) and the experience of depressive symptoms (50%). These findings suggest that depressive symptoms are more prevalent in persons with PPS than previously reported.

An important caveat is that overall rates of depression in polio survivors may be skewed by a significantly higher incidence in the subsample of persons diagnosed with PPS. For

example, Hazendonk and Crowe (2000) originally set out to examine the cognitive differences between a sample of polio survivors (including those with PPS) and a non-disabled control group. The researchers used single-factor, repeated measures ANOVA with planned comparisons analysis. The combined polio and PPS group reported a significantly higher frequency of 11 symptoms (e.g., depression, fatigue, and muscle pain) that disrupted their usual daily activities ($p < .001$) compared to the control group. This finding was an artifact because it was skewed by the scores of the PPS subgroup. Depression scores (BDI-II; Beck, Steer, & Brown, 1996) in the PPS and polio survivor groups were significantly different. The PPS group ($M = 16.22$, $SD = 10.35$) scored over 10 points higher than the control group ($M = 5.86$, $SD = 4.63$) and the polio survivor's group ($M = 6.05$, $SD = 4.96$). Repeated studies of similar design using distinct subgroups are needed to clarify the reliability of this finding; however, it appears that persons with PPS suffer from higher levels of depression than polio survivors do.

Regarding the specific correlates of depression in persons with PPS, Maynard (1991) found that higher levels of depression were associated with higher pessimism, and holding in or venting anger, in the absence of constructive problem solving. Westbrook and McIlwain (1996) surveyed 176 people with PPS at one and five year intervals about their emotional reactions to having PPS. Accommodating or accepting the diagnosis was related to the use of more positive strategies ($r = .25$, $F_{3,162}$, $p < .01$). These studies highlight the importance of individual attitudes about aging with a disability.

Researchers have investigated the relationship between the following resilience factors and mental health in the general population: *acceptance* (Langer, 2004; Tate et al., 1994; Westbrook & McIlwain, 1996), *self-efficacy* (Becker & Schaller, 1995; Caplan, 1990; Wagnild & Young, 1990), *personal resources/social support* (Fredrickson et al., 2003; Rabkin, Remien, Katoff, & Williams, 1993; Stuitbergen, Seraphine, & Roberts, 2000; Werner & Smith, 1982), *interpersonal relationships* (Heisel, 2006; Kinsel, 2005; Rutter, 1985, 1987), *self-rated health* (Acierno, Ruggiero, Kilpatrick, Resnick, & Galea, 2006; Kling et al., 2000; Tate et al., 1994), *spiritual growth* (Harrison & Stuitbergen, 2006; Higgins, 1994; Kinsel, 2005; Langer, 2004; Silberman, 2005), and *stress management* (Caplan, 1990). Taken together, studies with polio survivors and the general population suggest that intrapersonal resilience factors such as optimism, problem-solving attitude, and acceptance may be integral sources of successful coping with the sometimes-overwhelming stressors of PPS. We suggest that for persons with PPS, who have spent a lifetime managing the challenges of living with functional limitations, resilience characteristics and responses may be important keys to coping with change. The factors measured in this study represent a portion of the total construct of PR and were selected from a larger data set of health indicators in a sample of older polio survivors (over age 65) as described below.

Methods

Participants

This cross-sectional secondary analysis involved a convenience sample of 630 adults who were 65 years or older and had indicated they had been diagnosed by a physician as having PPS. The sample was derived from a larger group who had participated in a study of factors influencing quality of life in polio survivors (Stuitbergen, Seraphine, Harrison, & Adachi, 2005). The original sample was recruited from the mailing list of the International Polio Network, which represents approximately 6,000 polio survivors in all 50 states. After the local institutional review board approved the study, the executive director of the organization provided an initial description of the study, which was mailed to a random sample of 2,962 participants. A second letter from the primary investigator gave further details about participation in the study. Persons who were interested and returned an

enclosed participation form were mailed a consent letter, instructions, the survey booklet containing a battery of health instruments, and a stamped pre-addressed envelope. A total of 2,153 usable surveys formed the basis of the initial study. The mean age of participants in the older subgroup ($n = 630$) selected for this study was 72.43 years ($SD, 5.65$), and the majority were female (65.4%), married (61.4%), and white (98.7%). More than 70% of the sample had 12 or more years of education; 17.1% were working full or part-time; 7.7% were unemployed due to age or disability; and 74% were retired.

Measures

The original Incapacity Status Scale (Kurtzke, 1981) is a 16-item self-report questionnaire used to measure functional limitations in activities of daily living in persons with multiple sclerosis. The scale was adapted for use with persons with polio (Stuifbergen et al., 2005). Responses range from “0” for no functional deficit to “5” for inability to perform the activity by one’s self. Areas assessed include vision, feeding, bowel and bladder functioning, and stair climbing. An internal consistency reliability of .88 was reported in a sample of persons with multiple sclerosis using the original scale. The Chronbach’s alpha was .80 for this sample using the 15-item adapted version for persons with PPS.

The Acceptance of Illness Scale (Stuifbergen et al., 2000) is a 14-item, 5-point Likert-style scale used to measure the belief that disability is integrated into one’s way of life: one accommodates, but does not “give up” on life (Harrison, Stuifbergen, Adachi, & Becker, 2004; Stuifbergen et al., 2000; Tate et al., 1994). Items range from 1 (strongly agree) to 5 (strongly disagree). Good internal reliability coefficients of .83 and .84 were obtained for persons with chronic disabling conditions and polio survivors respectively (Stuifbergen et al., 2000, 2005), and .82 was obtained for this sample.

Self-efficacy or the quality of being self-confident in mastering difficult situations (Bandura, 1982) was measured using the 28-item, 5-point Self Rated Abilities for Health Practices Scale (SRAHP; Becker, Stuifbergen, Oh, & Hall, 1993; Becker & Schaller, 1995). The SRAHP is used to gauge beliefs about a person’s ability to perform specific health-promoting practices within the context of lifestyle and disabilities. Ratings from 0 (not at all) to 4 (completely) are possible with a total range of 0-112 (higher values indicating higher self-efficacy). A Chronbach’s alpha of .93 was previously reported in a sample of persons with chronic and disabling conditions (Stuifbergen et al., 2000); it was .89 for this sample.

The Personal Resource Questionnaire (PRQ-85; Weiner & Brandt, 1985) is a 7-point (from strongly disagree to strongly agree), 25-item tool used to assess individual resources based on five dimensions: worth, social integration, intimacy, nurturance, and assistance. Social integration is inversely related to depression scores in persons with disability (Fuhrer, Rintala, Hart, Clearman, & Young, 1993). In this study, we used the PRQ-85 as a measure of overall *social support*. The PRQ-85 is widely accepted as having sound convergent and discriminate validity, and high internal reliability. A Chronbach’s alpha of .93 was reported for a sample of persons with multiple sclerosis; it was .92 for this sample.

Lawton’s Self-rated Health Scale (SRH; Lawton, Moss, Fulcomer, & Kleban, 1982) was used to evaluate self-appraised health. SRH is a well-documented predictor of longevity (Idler & Beniamini, 1997). Low self-rated health predicts higher morbidity, including depression (Beal & Stuifbergen, 2007) and mortality (Idler & Beniamini). Lawton’s SRH scale contains four questions with a total range from 0 to 13, with higher total scores indicating better overall self-rated health. Lawton et al. (1982) reported an adequate Chronbach’s alpha of .76. Chronbach’s alpha for this sample was slightly higher at .78.

Interpersonal relationships, spiritual growth, and stress management are three subscales of the Health Promoting Lifestyle Profile II (Walker & Hill-Polrecky, 1996). Participants are asked to rate 52 current health seeking habits using one of four choices: N (never), S (sometimes), O (often), or R (routinely). Nine items measure interpersonal relationships (Chronbach's $\alpha = .76$); nine items assess spiritual growth (Chronbach's $\alpha = .85$); and eight items gauge stress management (Chronbach's $\alpha = .71$). All internal consistency reliabilities were for this sample. The *interpersonal relationship* subscale includes statements related to meeting one's needs for intimacy, spending time with close friends, and showing concern and love for others. The *spiritual growth* subscale includes questions that rate one's feelings about purpose in life, working toward long-term goals, and feeling connected to a force greater than oneself. In the *stress management* subscale, respondents are asked to rate how often they engage in pacing to preserve energy and balancing work, sleep, and play. In testing the assumptions of all seven independent variables, the distributions approximated normal curves, and bivariate correlations were $< .67$, indicating that multi-collinearity was not problematic in the analysis.

The dependent variable-depressive symptoms-was measured by the short version of the Center for Epidemiologic Studies Depression Scale (CES-D 10; Radloff, 1977). The CES-D 10 was developed in older adult samples and has good reliability and predictive accuracy when compared with the longer 20-item version ($\kappa = .97$, $p < .001$; Andresen, Malmgren, Carter, & Patrick, 1994). On the CES-D 10, participants are asked to rate how often they have experienced feelings such as "depressed," or "lonely." Items range from 0 (rarely or none of the time; less than one time per day) to 3 (most of the time; 5-7 days). Chronbach's alpha for this sample was .89. Importantly, the CES-D 10 may not fully control for the influence of fatigue and pain, known mediators of depression in disabled populations; therefore, this issue must be considered in the final analysis. A cutoff score of 10 was used to indicate the presence of moderate to severe depressive symptoms (Andresen et al., 1994).

Results

Although the entire sample was over age 65, survivors of polio, and currently diagnosed with PPS, the majority (53%) rated their health as good or excellent (see Figure 1). The overall mean CES-D 10 score for the sample was 8.69 (SD = 5.2), as compared with only 4.7 (SD = 0.1) for a large sample ($n = 1,206$) of older adults (Andresen et al., 1994). The typical cut-off score on the CES-D 10, indicating the presence of moderate to severe depressive symptoms, is 10. Forty percent of the sample scored in this range, a percentage well above the average cited for both older persons who are not disabled (1.8-24%; Cole & Dendukuri, 2003³) and older persons with disability (10-30%; Fuhrer et al., 1993; Kemp et al., 1997; McColl & Rosenthal, 1994; Zauszniewski, Morris, Preechawong, & Chang, 2004). Thus, depressive symptoms were pervasive, even while the majority of the participants reported good or excellent health.

The bivariate correlations between the PR factors and the dependent variable are shown in Table 1. As expected, the seven resilience variables had moderately high negative and significant ($p < .01$) correlations with depression, ranging from $-.33$ (stress management subscale) to $-.51$ (spiritual growth subscale). Thus, persons who tended to have higher scores on measures of spiritual growth ($r = -.51$), acceptance ($r = -.44$), social support ($-.44$), and self-rated health ($-.41$) reported fewer depressive symptoms.

A stepwise multiple regression analysis was completed to determine the extent that resilience factors predicted depressive symptoms. Functional limitations and age were

³Other cited studies may not have used the same depression scale.

entered into the first block of the analysis to control for their known effects on depression (Conrady, Wish, Agre, Rodriguez, & Sperling, 1989; Kemp et al., 1997; Kling et al., 2000). The four factors with the strongest correlations were entered into the second step of the regression model, and the last three factors entered into the third step. The model summary is shown in Table 2. Age was not a significant predictor, probably due to the low variance of age across the sample. After controlling for functional limitations, which accounted for 7% of the variance in depressive symptoms, the first four factors (spiritual growth, social support, acceptance, and self-rated health) explained 30% of the variance in depressive symptoms. Spiritual growth was the main predictor ($\beta = -.25$), followed by social support ($\beta = -.18$). Adding the final three variables, self-efficacy, stress management, and interpersonal relationships, contributed only 1% to the overall model.

Discussion

Returning to our conceptual framework of psychological resilience in the context of aging persons with diagnosed PPS, we proposed that resilience is a broad construct comprised of a combination of various resilience factors: character traits (e.g., acceptance, curiosity, flexibility) and coping responses or behaviors (e.g., talking to family or friends about PPS, problem-solving) that facilitate the successful management of unexpected changes (i.e., diagnosis of post-polio syndrome) or formidable stressors (unexpected increase in functional limitations) in one's life. We hypothesized that as use of resilience factors increased, the level of depressive symptoms would decrease. Psychological resilience was suggested by the results; 53% of the sample rated their health as good or excellent (Figure 1) despite the following findings: a) they were polio survivors currently experiencing post-polio symptoms; b) there was a high level of self-reported depressive symptoms ($M = 8.69$, $SD = 5.2$); and c) 40% scored at or above 10 on the CES-D 10, indicating the presence of moderate to severe depressive symptoms.

These findings reveal a paradox. How could depressive symptoms be quite pervasive, yet more than half the sample report good or excellent self-rated health (SRH)? Studies of persons who have survived severe crises or illnesses such as polio have shown that depression may be a lingering and chronic problem throughout the remainder of life (Bruno, 1999; Hollingsworth, Didelot, & Levington, 2002); however, resilience traits and coping responses may counter depressive symptoms by fostering feelings of hope, self-reliance, and optimism. Further study may unravel the relationship between high levels of SRH and concomitant high levels of depressive symptoms in the context of aging with a disability such as in PPS.

We were not surprised to find that functional status explained 7% of the variance in depressive symptoms. Nevertheless, our theoretical framework focuses on psychological factors that may moderate self-reported functional impairment (Jang et al., 2004). Table 3 contains a synthesis of related resilience themes as follows: Column I contains strategies from the literature that persons with PPS found helpful in managing PPS; Column II contains related resilience factors; and Column III contains items from the spiritual subscale of the HPLP II, the primary predictor of lower depressive symptoms in the study. Reflecting on the conceptual connections between items presented in Table 3 may be useful in helping nurses and other health care providers in promoting resilience in older adults diagnosed with PPS. For example, three items in the spiritual subscale, "looking forward to the future," "expose myself to new experiences and challenges," and "feel content and at peace with myself" represent psychological inner-strength concepts that can be encouraged during the vital two-way interaction that occurs at the clinical visit. At the same time, these themes are general enough to respect the diversity of religious differences in patient populations. Spiritual growth is conceptualized as a search for purpose or meaning in life, or belief in the

goodness of the world and one's ability to change it and improve the self (Silberman, 2005). Pargament (1997) and Silberman (2005) have proposed that religious meaning systems can influence emotions, well-being, and the decision-making processes that help people to cope with adversity. The results of this study support this notion.

Rehabilitation nurses can utilize these findings by first recognizing and encouraging resilient attributes in their patients such as realistic acceptance of PPS, a future-orientation, optimistic self-rated health, and willingness to maintain social ties with at least one confidant or friend. Establishing a trusting collaborative relationship is the vehicle through which these patients' strengths are discovered. Most importantly, it is essential to assess persons aging with PPS for depressive symptoms as a routine practice at each point of care.

Gordon and Feldman (2002) recommended other useful counseling techniques to assist individuals with PPS to deal with the stresses associated with the illness, beginning by examining how clients view new problems associated with PPS. Helping the client to look at new symptoms as part of a "larger chronic health condition" (p. 31) is a healthier alternative than seeing symptoms as an acute problem. Inviting the client to become a part of the management team can benefit passive patients. Providing information on techniques to deal with anxiety and anger management may be useful. Finally, supporting patients' personal values and beliefs is an ethically sound component of caring for all patients regardless of diagnosis. Further research may determine whether this type of counseling can produce lasting benefits.

Limitations of the study include the self-report nature of the data and the cross-sectional design of the study. The original sample was recruited through a polio-related organization whose members may not represent the general population of persons with post-polio syndrome. In addition, other variables were not explored that may significantly affect depression, including pain, fatigue, and the number of co-morbidities.

Conclusion

Preventing depressive symptoms from developing into depression is a worthwhile goal for health promotion in older adults diagnosed with PPS. While no causal relationships are posited as a result of the study, future studies should explore the potential for psychological resilience factors to ameliorate depressive symptoms. Rehabilitation nurses are in an ideal position to encourage resiliency while providing emotional support. Although the vicissitudes of life cannot be altered, patients diagnosed with PPS can be helped in positive ways by offering encouragement and hope.

Acknowledgments

Grant number R01NR003195 from the National Institute of Nursing Research supported this study. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Nursing Research or the National Institutes of Health.

References

- Acierno R, Ruggiero KJ, Kilpatrick DG, Resnick HS, Galea S. Risk and protective factors for psychopathology among older versus younger adults after the 2004 Florida hurricanes. *The American Journal of Geriatric Psychiatry*. 2006; 14(12):1051–1059. [PubMed: 17035356]
- Andresen EM, Malmgren JA, Carter WB, Patrick DL. Screening for depression in well older adults: Evaluation of a short form of the CES-D (Center for Epidemiologic Studies Depression Scale). *American Journal of Preventive Medicine*. 1994; 10(2):77–84. [PubMed: 8037935]
- Bandura A. Self-efficacy mechanism in human agency. *American Psychologist*. 1982; 37(2):122–147.

- Beal CC, Stuifbergen A. Loneliness in women with multiple sclerosis. *Rehabilitation Nursing*. 2007; 32(4):165–171. [PubMed: 17650784]
- Beck, AT.; Steer, RA.; Brown, GK. Manual for Beck Depression Inventory-II. Psychological Corporation; San Antonio: 1996.
- Becker, LC. Polio survivors in the U.S. 1925–2000 age distribution data. 2006. Retrieved on July 8, 2008, from <http://www.post-polio.org/PolioSurvivorsInTheUS1915-2000.pdf>
- Becker H, Schaller J. Perceived health and self-efficacy among adults with cerebral palsy. *Journal of Rehabilitation*. Apr-May;1995 :36–42.
- Becker H, Stuifbergen A, Oh HS, Hall A. The Self-Rated Abilities for Health Practices Scale: A health-efficacy measure. *Health Values*. 1993; 17:42–50. Retrieved December 16, 2008, from <http://www.crowdbcm.net/measures/Measures-III-HPbehav.htm>.
- Bruno, RL. Handbook of the Late Effects of Poliomyelitis. St. Louis Gazette International Network 1999; 1999. Emotional stress in polio survivors and post-polio sequelae. Retrieved on January 6, 2009, from <http://www.poliooutreach.com/EmotionalStressinPolioSurvivorsandPPS1.htm>
- Caplan G. Loss, stress, and mental health. *Community Mental Health Journal*. 1990; 26:27–48. [PubMed: 2344725]
- Cole MG, Dendukuri N. Risk factors for depression among elderly community subjects: A systematic review and meta-analysis. *American Journal of Psychiatry*. 2003; 160(6):1147–56. [PubMed: 12777274]
- Connor KM, Davidson JRT. Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*. 2003; 18:76–82. [PubMed: 12964174]
- Conrady L, Wish J, Agre J, Rodriguez AA, Sperling KB. Psychologic characteristics of polio survivors: A preliminary report. *Archives of Physical Medicine and Rehabilitation*. 1989; 70:458–463. [PubMed: 2730310]
- Fredrickson BL, Tugade MM, Waugh CE, Larkin GR. What good are positive emotions in crises? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of Personality and Social Psychology*. 2003; 84:365–376. [PubMed: 12585810]
- Fuhrer M, Rintala D, Hart K, Clearman R, Young M. Depressive symptomatology in persons with spinal cord injury who reside in the community. *Archives of Physical Medicine and Rehabilitation*. 1993; 74:255–260. [PubMed: 8439251]
- Gordon PA, Feldman D. Post-polio syndrome: Issues and strategies for rehabilitation counselors. *Journal of Rehabilitation*. 2002; 68:28–32.
- Greene, RR., editor. Resiliency: An integrated approach to practice, policy, and research. National Association of Social Workers, NASW Press; Washington, DC: 2002.
- Hallam, H. Post-polio syndrome: From learning it exists through to better managing your life. 2000. Retrieved March 11, 2008, from <http://www.ott.zynet.co.uk/polio/lincolnshire/linkpin/lincpinvol02issue09.html#5>
- Halstead L. Living with the late effects of disability: A five year follow-up survey of coping among post-polio survivors. *Australian Occupational Therapy Journal*. 1994; 43:60–71.
- Halstead, L. Post polio syndrome. *The Scientific American*; Apr. 1998 p. 36-41. Retrieved June 26, 2008, from <http://www.ott.zynet.co.uk/polio/lincolnshire/library/halstead/sciampps.html>
- Harrison T, Stuifbergen A. Life purpose: Effect on functional decline and quality of life in polio survivors. *Rehabilitation Nursing*. 2006; 31(4):149–154. [PubMed: 16789672]
- Harrison T, Stuifbergen A, Adachi E, Becker H. Marriage, impairment, and acceptance in persons with multiple sclerosis. *Western Journal of Nursing Research*. 2004; 26(3):291–292.
- Hazendonk K, Crowe SF. A neuropsychological study of the postpolio syndrome: Support for depression without neuropsychological impairment. *Neuropsychiatry, Neuropsychology, and Behavioral Neurology*. 2000; 13(2):112–118.
- Heisel MJ. Suicide and its prevention among older adults. *Canadian Journal of Psychiatry*. 2006; 51(3):143–154.
- Higgins, GO. Resilient adults: Overcoming a cruel past. Jossey-Bass; San Francisco: 1994.

- Hollingsworth L, Didelot MJ, Levington C. Post-polio syndrome: Psychological adjustment to disability. *Issues in Mental Health Nursing*. 2002; 23:135–156. [PubMed: 11901659]
- Idler EL, Beniamini Y. Self-rated health and mortality: A review of twenty-seven community studies. *Journal of Health and Social Behavior*. 1997; 38(1):27–37.
- Insel, T. Depression: Top cause of medical disability. *AMNews*; Apr 2. 2007 Retrieved June 26, 2008, from <http://www.ama-assn.org/amednews/2007/04/02/hlsb0402.htm>
- Jang Y, Poon LW, Martin P. Individual differences in the effects of disease and disability on depressive symptoms: The role of age and subjective health. *International Journal of Aging and Human Development*. 2004; 59(2):125–137. [PubMed: 15453141]
- Kemp, B. Board on Health Sciences Policy. Appendix N. NAP; 2006. Depression as a secondary condition in people with disabilities: A new look - summary and background papers; p. 234-250. Retrieved March 17, 2008, from [http://www.nap.edu/openbook.php?recore_id=11579&page=234\(-250\)](http://www.nap.edu/openbook.php?recore_id=11579&page=234(-250))
- Kemp B, Adams B, Campbell M. Depression and life satisfaction in aging polio survivors versus age-matched controls: Relation to postpolio syndrome, family functioning, and attitude toward disability. *Archives of Physical and Medical Rehabilitation*. 1997; 78:187–192.
- Kemp BJ, Krause S. Depression and life satisfaction among people ageing with post-polio and spinal cord injury. *Disability and Rehabilitation*. 1999; 21(5/6):241–249. [PubMed: 10381236]
- Kinsel B. Resilience as adaptation in older women. *Journal of Women & Aging*. 2005; 17(3):23–39. [PubMed: 16186093]
- Kling C, Persson, Gardulf A. The health-related quality of life of patients suffering from the late effects of polio (post polio). *Journal of Advanced Nursing*. 2000; 32(1):164–173. [PubMed: 10886448]
- Kobasa SC, Maddi SR, Kahn S. Hardiness and health: A prospective study. *Journal of Personality and Social Psychology*. 1982; 42:168–178. [PubMed: 7057354]
- Kurtzke JF. A proposal for a uniform minimal record of disability in multiple sclerosis. *Acta Neurological Scandinavica*. 1981; 64(Suppl. 87):110–129.
- Langer N. Resiliency and spirituality: Foundations of strengths perspective counseling with the elderly. *Educational Gerontology*. 2004; 30:611–617.
- Lawton M, Moss M, Fulcomer M, Kleban M. A research and service oriented multilevel assessment instrument. *Severe Handicaps*. 1982; 11(4):240–245.
- Lazarus, RS.; Folkman, S. *Stress appraisal and coping*. Springer; New York: 1984.
- Luthar SS, Cicchetti D, Becker B. The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*. 2000; 71:543–562. [PubMed: 10953923]
- March of Dimes. Identifying best practices in diagnosis and care; March of Dimes International Conference; 2000; Retrieved March 4, 2008, from www.marchofdimes.com
- Maynard FM. The late effects of polio: A model for the identification and assessment of preventable secondary disabilities. *Post-Polio Health*. 1991; 7(3) Retrieved December 16, 2008, from <http://www.post-polio.org/edu/pphnews/pph7-3.html>.
- Mayo Clinic. (n.d.). Post-polio syndrome. Retrieved March 31, 2008, from <http://www.mayoclinic.com/health/post-polio-syndrome/DS00494>
- McColl MA, Rosenthal C. A model of resource needs of aging spinal cord injured men. *Paraplegic*. 1994; 32:261–270.
- McCubbin, L. Challenges to the definition of resilience; Paper presented at the meeting of the American Psychological Association; San Francisco, CA. 2001, August 24;
- National Institute of Neurological Disorders and Stroke. (n.d.). Post-polio syndrome fact sheet. Retrieved June 23, 2008, from http://www.ninds.nih.gov/disorders/post_polio/detail_post_polio.htm
- Pargament, KI. *The psychology of religion and coping*. The Guilford Press; New York: 1997.
- Polk LV. Toward a middle-range theory of resilience. *Advances in Nursing Science*. 1997; 19(3):1–13. [PubMed: 9055026]
- Rabkin J, Remien R, Katoff L, Williams J. Resilience in adversity among long-term survivors of AIDS. *Hospital Community Psychiatry*. 1993; 44(2):162–167. [PubMed: 8432502]

- Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measures*. 1977; 1:385–401.
- Ramaraj R. Post-poliomyelitis syndrome: Clinical features and management. Symposium on Neurology. *British Journal of Hospital Medicine*. 2007; 68(12):648–650.
- Ramlow J, Alexander M, LaPorte R, Kaufman NC, Kuller L. Epidemiology of post polio syndrome. *American Journal of Epidemiology*. 1992; 136:769–786. [PubMed: 1442743]
- Rutter M. Resilience in the face of adversity: Protective factors and resistance to psychiatric disorder. *British Journal of Psychiatry*. 1985; 147:598–611. [PubMed: 3830321]
- Rutter M. Psychosocial resilience and protective mechanisms. *American Journal of Orthopsychiatry*. 1987; 57(3):316–331. [PubMed: 3303954]
- Rutter M. Resilience, competence, and coping. *Child Abuse & Neglect*. 2007; 31:205–209. [PubMed: 17408738]
- Sanchez DI. Stress, coping, and psychological adaptation of individuals with post-polio sequelae. *Dissertation Abstracts International*. Oct.1997 58(4-B):2136.
- Silberman I. Religion as a meaning system: Implications for the new millennium. *Journal of Social Issues*. 2005; 61(4):641–663.
- Simon GE, VonKorff M. Recognition, management, and outcomes of depression in primary care. *Archives of Family Medicine*. 1995; 4:99–105. [PubMed: 7842160]
- Stuitbergen AK. Secondary conditions and life satisfaction among polio survivors. *Rehabilitation Nursing*. 2005; 30(5):173–178. [PubMed: 16175922]
- Stuitbergen AK, Seraphine A, Harrison T, Adachi E. An explanatory model of health promotion and quality of life for persons with post-polio syndrome. *Social Science & Medicine*. 2005; 60:383–393. [PubMed: 15522493]
- Stuitbergen A, Seraphine A, Roberts G. An explanatory model of health promotion and quality of life in chronic and disabling conditions. *Nursing Research*. 2000; 49:122–129. [PubMed: 10882316]
- Tate D, Kirsch N, Maynard F, Peterson C, Forchheimer M, Roller A, Hansen N. Coping with the late effects: Differences between depressed and non-depressed polio survivors. *American Journal of Physical Medicine and Rehabilitation*. 1994; 73(1):27–35. [PubMed: 8305178]
- Tugade MM, Frederickson BL. Resilient individuals use positive emotions to bounce back from negative emotional experiences. *Journal of Personality and Social Psychology*. 2004; 86(2):320–333. [PubMed: 14769087]
- U.S. Department of Health and Human Services. Mental Health: A Report of the Surgeon General. U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, Center for Mental Health Services, National Institutes of Health. National Institute of Mental Health; Rockville, MD: 1999. Retrieved January 7, 2009, from <http://www.surgeongeneral.gov/library/mentalhealth/toc.html#chapter5>
- Unutzer J, Patrick DL, Simon G, Grembowski D, Walker E, Rutter E, et al. Depressive symptoms and the cost of health services in HMO patients aged 65 and over: A 4-year prospective study. *Journal of the American Medical Association*. 1997; 277:1618–1623. Abstract retrieved August 20, 2008, from <http://www.ncbi.nlm.nih.gov/sites>. [PubMed: 9168292]
- Wagnild G, Young HM. Resilience among older women. *Image Journal of Nursing Scholarship*. 1990; 22:252–255.
- Walker S, Hill-Polrecky D. Psychometric evaluation of the Health Promoting Lifestyle Profile: Development and psychometric characteristics. *Nursing Research*. 1996; 36(2):76–81. [PubMed: 3644262]
- Weber MA, Schonknecht P, Pilz J, Storch-Hagenlaöcher B. Abstract [Postpolio syndrome. Neurologic and psychiatric aspects]. *Nervenarzt*. Apr; 2004 75(4):347–354. [PubMed: 15088090]
- Weiner C, Brandt P. The Personal Resource Questionnaire (PRQ-85). 1985 Retrieved August 6, 2008, from <http://www.montana.edu/cweinert/prq85.html>.
- Wenneberg S, Ahlström G. Illness narratives of persons with post-polio syndrome. *Journal of Advanced Nursing*. 2000; 30(2):354–361. [PubMed: 10672093]
- Werner, E.; Smith, R. *Vulnerable but invincible: A longitudinal study of resilient youth and children*. McGraw-Hill; New York: 1982.

- Westbrook M, McIlwain D. Living with the late effects of disability: A five year follow-up survey of coping among post-polio survivors. *Australian Occupational Therapy Journal*. 1996; 43:60–71.
- Westbrook MT. A survey of post-poliomyelitis sequelae: Manifestations, effects on people's lives and responses to treatment. *Australian Journal of Physiotherapy*. 1991; 37:89–102.
- Zauszniewski JA, Morris DL, Preechawong S, Chang H. Reports on depressive symptoms in older adults with chronic conditions. *Research and Theory for Nursing Practice*. 2004; 18(2-3):185–196. Retrieved March 13, 2005, from <http://txaustintx.library.ingentaconnect.com>. [PubMed: 15553346]

Figure 1.
Self-rated health of a sample of older adults (n=630) diagnosed with post-polio syndrome (1 = poor, 2 = fair, 3 = good, 4 = excellent).

Table 1

Correlations of psychological resilience (PR) factors and depressive symptoms in older adults diagnosed with PPS (N = 619-630).¹

	Acceptance	Self-efficacy	Social Support	Interpersonal Relations	Spiritual Growth	Stress Management	Self-Rated Health
Acceptance	-						
Self-efficacy	.32(**)	-					
Social Support	.27(**)	.46(**)	-				
Interpersonal Relations	.28(**)	.51(**)	.70(**)	-			
Spiritual Growth	.46(**)	.53(**)	.56(**)	.68(**)	-		
Stress Management	.31(**)	.48(**)	.32(**)	.50(**)	.57(**)	-	
Self-rated Health	.38(**)	.36(**)	.33(**)	.24(**)	.40(**)	.20(**)	-
Depressive Symptoms	-.44(**)	-.35(**)	-.44(**)	-.36(**)	-.51(**)	-.33(**)	-.41(**)

** p < .01 level (two-tailed).

¹ Variation in (n) due to missing data.

Model summary: Stepwise regression of seven resilience variables on depressive symptoms accounting for functional limitations.

Table 2

Model	R	R ²	Adjusted R ²	Standard Error of estimate	R ² Change	F Change	Df1	Df2	Significance F Change
1	.27 ^a	.07	.07	5.01	.07	47.27	1	610	.00
2	.61 ^b	.37	.37	4.13	.30	73.45	4	606	.00
3	.62 ^c	.38	.37	4.12	.01	1.73	3	603	.16

^aPredictors: Constant and functional limitations

^bPredictors: Constant and functional limitations, spiritual growth, acceptance, social support, self-rated health

^cPredictors: Constant and functional limitations, spiritual growth, acceptance, social support, self-rated health, stress management, self-efficacy, interpersonal relations

Table 3

Strategies for persons managing PPS, related resilience factors, and concepts of spiritual growth.

I. Strategies that may Enhance Successful Management of PPS⁴	II. Related Resilience Factors⁵: Psychological traits, personal values, social support, and behaviors	III. Related Items from the Spiritual Growth Subscale (HPLP II)
1. Read more about post-polio.	Cognitive skills, intelligence, sense of mastery, strong desire to learn.	<ul style="list-style-type: none"> • Feel I am growing and changing personally in positive directions.
2. Become more involved in interests I can still pursue.	Acceptance, self-confidence, belief in self-efficacy, high-level activity, multiple interests, and hobbies.	<ul style="list-style-type: none"> • Find each day interesting and challenging. • Look forward to the future.
3. Talked with my family or friends about post-polio.	Good peer-relations, communications skills, positive interpersonal interactions, and commitment to relationships.	<ul style="list-style-type: none"> • Aware of what is important to me.
4. Developed new interests and leisure pursuits.	Wide-ranging interests, novelty seeking, creative, goal setting, achievement oriented, curiosity, internal locus of control, ability to adapt to changing circumstances, resourcefulness.	<ul style="list-style-type: none"> • Expose self to new experiences and challenges.
5. Develop my philosophy of life.	Committed to reflecting on life over time, belief that self-knowledge is valuable.	<ul style="list-style-type: none"> • Believe my life has a purpose. • Feel content and at peace with myself. • Am aware of what is important to me.
6. Become a more spiritual person (develop my inner life).	Realization that life has a purpose, faith in a positive vision of one's world, belief in self-help, belief that life is worthwhile.>	<ul style="list-style-type: none"> • Believe my life has a purpose. • Feel connected with some force greater than myself.
7. Choosing to be optimistic (Frederickson & Tugade, 2003).	Having a positive outlook, finding positive meanings in experiences, choosing to be optimistic.	<ul style="list-style-type: none"> • Feel I am growing and changing personally in positive directions. • Look forward to the future.
8. Constructive problem solving (Sanchez, 1997).	Resourcefulness, action takers, realistic appraisal of situations and capacities, repertoire of problem solving approaches.	<ul style="list-style-type: none"> • Work toward long-term goals in my life. • Find each day interesting and challenging.

⁴1-6: from Westbrook & McIlwain (1996).

⁵Each of the resilience factors listed in column II is supported by one or more empirical studies, as compiled by Polk (1997).