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Activity Restriction and Depression in Medical Patients and their Caregivers: A Meta Analysis

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Abstract

Depression commonly occurs in conjunction with a variety of medical conditions. In addition, family members who care for patients with medical diagnoses often suffer from depression. Therefore, in addition to treating illnesses, physicians and other healthcare professionals are often faced with managing secondary mental health consequences. We conducted a systematic review and meta-analysis of the association between activity restriction and depression in medical patients and their caregivers. A total of 34 studies ($N = 8,053$) documenting the relationship between activity restriction and depression were identified for the period between January 1980 and June 2010. Effect sizes were calculated as Pearson r correlations using random-effects models. The correlation between activity restriction and depression was positive and of large magnitude ($r = 0.39$; 95% CI, .34–.44). Activity restriction was most strongly correlated with depression in medical patients ($r = 0.45$; 95% CI, 0.42–0.48), followed by caregivers ($r = 0.34$; 95% CI, 0.28–0.41) and community-dwelling adults ($r = 0.28$; 95% CI, 0.25–0.31). Activity restriction associated with medical conditions is a significant threat to well-being and quality of life, as well as to the lives of their caregivers. Assessment and treatment of activity restriction may be particularly helpful in preventing depression.

Keywords

Depression; Activity Restriction; Chronic disease; Older adults; Aging; Behavioral Activation; Behavior Therapy

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DISCLOSURES

All authors declare no competing interests.

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INTRODUCTION

Depression has been described as one of the most pressing public health problems in the United States (Hasin, Goodwin, Stinson, & Grant, 2005) and has been recognized as the third leading cause of disease burden in the world, accounting for 4.3% of disability associated life years (DALYs) (World Health Organization, 2008). While the lifetime estimate of Major Depressive Disorder (MDD) is estimated at 13.2% (Hasin et al., 2005), the prevalence of depression is significantly higher in those with various medical conditions (Egede, 2007; Moussavi et al., 2007) and their caregivers (Baumgarten et al., 1992; Beach, Schulz, Yee, & Jackson, 2000; Bookwala, Yee, & Schulz, 2000). The presence of depressive symptoms nearly doubles healthcare costs including primary care, medical specialty, medical inpatient, pharmacy, and laboratory costs (Simon, VonKorff, & Barlow, 1995). Depression has been identified as a significant impediment to rehabilitation outcome in medical patients (Chemerinski, Robinson, & Kosier, 2001; Pohjasvaara, Vataja, Leppavuori, Kaste, & Erkinjuntti, 2001) and is a risk factor for morbidity and mortality in medical patients and their caregivers (Frasure-Smith et al., 2009).

A number of biological (Gillespie, Garlow, Binder, Schatzberg, & Nemeroff, 2009) and psychological (Beck & Alford, 2009) theories have been proposed as to the onset and maintenance of depression in older medically patients and caregivers. Among these, restriction of social and recreational activities is common to both medical patients and their caregivers, and is a theoretical contributor to the experience of depressive symptoms in these populations (Williamson & Shaffer, 2000). The Activity Restriction Model of Depressed Affect (Williamson & Shaffer, 2000) proposes that increases in depressive symptoms occur as a result of life stresses that interfere with normal social and recreational activities. In this model, among patients with medical conditions, depression is not directly attributable to symptoms of illnesses, but rather to the activity restriction these patients experience in their everyday activities. Similarly, patients with medical illnesses, particularly chronic illnesses, are often discharged to the care of family members, who assume the burden of providing care for the patient. This care often interferes with the caregiver's engagement in activities, thus resulting in increased depression.

To date, there has been no systematic quantification of the relationship between activity restriction and depression. We conducted the present meta-analysis 1) to identify the correlation between activity restriction and depression in a variety of patient samples, and 2) to identify for whom and under what circumstances activity restriction is more strongly related to depression.

METHODS

Literature Search Strategy

We used 3 methods to identify studies for this meta-analysis. First, we used the reference lists of the most relevant reviews. Next, we searched MEDLINE, PsycINFO, and PsycARTICLES using the search terms *activity restriction*, *activity loss*, *depression*, and *depressive symptoms*. Finally, we used the "ancestry approach," (Cooper, 1998) which involves consulting the reference lists of retrieved articles to find earlier relevant studies. We included all relevant and accessible journal articles that were produced between January 1980 and June 2010 that assessed activity restriction and depression.

Study Selection

Our a priori criteria for inclusion encompassed any study that reported a mean continuous score on a measure of depressive symptoms [e.g., Center for Epidemiologic Studies – Depression scale (CESD); Beck Depression Inventory (BDI); Geriatric Depression Scale

(GDS); Hospital Anxiety and Depression Scale (HADS), etc], or included a binary categorization of depression using pre-defined criteria (e.g., DSM diagnosis of depression; ≥ 16 on the CESD, etc).

Similarly, we included studies that described any form of restriction to social and recreational activities that occurred as a function of: a) a medical illness (e.g., cancer, chronic obstructive pulmonary disease), b) being a caregiver to an individual with a medical illness (e.g., Alzheimer's Disease), or c) aging (e.g., community-dwelling older adults; fear of falling as a function of aging). However, we excluded studies that exclusively assessed physical disability, such as restriction in basic activities of daily living (e.g., ambulation; dressing), because physical disabilities are more directly tied to specific diseases and become the target of physical rehabilitation. In contrast, social and recreational restriction encompass a broader range of illness and conceptualized as targets of behavioral psychotherapies versus physical rehabilitation.

Data Extraction

We utilized a standardized method to extract the following information from articles: a) author names; b) publication year; c) sample size; d) study population (e.g., stroke patients; cancer caregivers); e) medical status (e.g., medical patients, caregivers, or community-dwelling adults); f) measure used to assess activity restriction; g) measure used to assess depression; h) mean age of study population; i) age range of study population; and j) percent of study population that was female.

Calculation of Effect Sizes and Statistical Analysis

Effect size r was used to characterize the relationship between activity restriction and depression for each of the 34 studies. For studies that did not report correlation coefficients (r), available study statistics were converted to r according to standard formulas (Hunter & Schmidt, 1990). Effect sizes were determined by two independent reviewers and for the majority of studies agreement was reached. In 3 cases, discrepancies were resolved by discussion between the two reviewers and a third reviewer until agreement was reached. Once study-level correlation coefficients were calculated, they were subjected to an r -to- z transformation and then weighted using inverse variance weights, aggregated, and their heterogeneity was assessed with the Q statistic (Hedges & Olkin, 1985) using a random effects model estimated via the method of moments procedure. To aid interpretation, Z_r effect sizes were converted back to into Pearson r using the inverse Z_r formula (Hedges & Olkin, 1985; Lipsey & Wilson, 2001). The meta-analysis macros for IBM SPSS Statistics, version 18.0 (SPSS Inc., Chicago, Illinois) (Lipsey & Wilson, 2001; Wilson), and MIX Version 2.0 (Bax, Yu, Ikeda, Tsuruta, & Moons, 2006) served as the statistical platforms for completing all statistical tests and associated graphic results.

We conducted five follow-up analyses to determine if sample characteristics were associated with our primary study outcomes. Our first analysis was for study population, which was characterized as three groups: a) medical patients (e.g., chronic pain; limb amputee; hearing/vision loss; cancer patients), b) caregivers (e.g., caregivers of disabled spouses; caregivers of cancer, stroke, and Alzheimer's disease patients), and c) community-dwelling adults (e.g., older adults). Research has demonstrated that community-dwelling adults have lower levels of AR and depression than medical patients or caregivers, but this differentiation is not so clear between medical patients and caregivers (Mausbach, Patterson, & Grant, 2008; Williamson, Shaffer, & Schulz, 1998).

Our second moderator analysis involved quality of AR assessment. We coded each method for the quality with which AR was assessed on a three-point scale. A rating of "lowest

quality” was assigned to studies that simply dichotomized subjects into one of two groups (e.g., severe/mild AR; participants asked if they had or had not restricted activities due to their illnesses), asked 1–2 questions relating to activity restriction, or reported a reliability coefficient <0.70 . A rating of “medium quality” was assigned to studies that utilized multiple questions to assess activity restriction (i.e., continuous measures), but the scale was not developed specifically to assess social and recreational AR (e.g., adaptations to scales assessing other constructs), simply provided a count of activities that were restricted (vs. the extent to which those activities were restricted), or the scale was reported a reliability coefficients ≤ 0.75 . A rating of “highest quality” was assigned to studies that utilized multiple questions to assess AR, assessed restriction to multiple social and recreational activities, assessed the extent to which several activities were restricted (vs. yes/no restricted) and had reported reliability coefficients above 0.75. We hypothesized that “highest quality” AR studies would have the greatest effect sizes with depression, followed by “medium quality” and “lowest quality,” respectively.

Year of study publication was our next moderator analysis. The distinct time period in which the study was published may be related to the effect size found, given the changes that have occurred in the treatment of depression, which would be expected to influence AR. Former meta analyses have found a significant moderator relationship for year of study publication due to changes in medical treatment over time (DeRoche & Welsh, 2008; Walters, 2002), and we expected to find similar results with this study.

Because females have higher rates of depression (American Psychiatric Association, 2000; Van de Velde, Bracke, Levecque, & Meuleman, 2010), our fourth moderator was percent of population that was female. We hypothesized that studies with greater proportion of females would demonstrate stronger correlations between activity restriction and depression.

Our final moderator was the mean age of the study population. Literature suggests that the relationship between physical and mental health are more strongly related to one another early in life (Lockenhoff & Carstensen, 2004), a phenomenon explained by Socioemotional Selectivity Theory (Carstensen, Fung, & Charles, 2003; Carstensen, Pasupathi, Mayr, & Nesselrode, 2000), which emphasizes the influence of time perspective (i.e., “perceived time left in life”) on goal priorities. Essentially, whereas younger adults emphasize novelty and future goals, older adults perceive time as limited and emphasize present-oriented goals that maximize emotional meaning. Indeed, the literature suggests that older adults have a tendency to attend to positive events/information over negative events/information (Charles, Mather, & Carstensen, 2003; Mather & Carstensen, 2003). As a result, although stressors may interfere with activity participation in at the same rate across age strata, *perceived* activity restriction may be diminished due to lifespan developmental changes. We therefore hypothesized that mean age would moderate the relationship between activity restriction and depression.

Post-hoc tests included weighted ANOVAs for categorical moderator variables (e.g., medical population, quality of AR assessment) and weighted regression for continuous moderator variables (e.g., year of publication). Both ANOVAs and meta regressions were random effects models estimated via the method of moments.

RESULTS

Of the initial 584 identified studies, most ($n = 466$) were excluded because they were not applicable to the present meta-analysis (e.g., articles on other topics, reviews or summaries) or were duplicate articles ($n = 29$). The remaining 89 articles were retrieved for full-text review, of which 57 were excluded because the study did not assess the relationship between

activity restriction or depression, data presented in the article duplicated that of another study (i.e., participants and data overlapped), or the study used the term “activity restriction” but measured other domains of functional disability not relevant to our goals (i.e., an exclusion criteria). Thus, 32 articles were selected for inclusion in the meta-analysis (see Figure 1). It should be noted that 2 of the 32 articles contained data that we treated as separate studies. The first (Nieboer et al., 1998) presented data from two separate studies with separate research participants. The second article (Williamson & Schulz, 1992) reported separate results for men and women on the correlation between activity restriction and depression. Thus, we present results for a total of 34 unique samples.

Characteristics of the 34 studies included in this meta-analysis are presented in Table 1. Overall, the number of participants in these studies ranged from 25 to 1,390 (total $n = 8,053$), with a mean of approximately 237 participants (median = 141). Nineteen studies enrolled participants with various medical illnesses (e.g., cancer, rheumatoid arthritis, COPD), 8 studies focused on activity restriction in caregivers (e.g., caregivers of patients with cancer, Alzheimer’s Disease, stroke), and the remaining 7 enrolled community-dwelling patients (e.g., older adults; adults with fear of falling). To assess depression, the majority of studies used either the Center for Epidemiologic Studies Depression scale (Radloff, 1976) (CESD; $n = 21$), Geriatric Depression Scale (Yesavage et al., 1982) (GDS; $n = 4$), or the Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983) (HADS, $n = 3$). In the 3 studies of children and adolescents, 2 utilized the Revised Child Anxiety and Depression Scale (RCADS) (Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000) and 1 utilized the Children’s Depression Inventory (CDI) (Kovacs, 1985). Methods of assessing activity restriction were much more variable, with a number of studies ($n = 8$) utilizing a single item [e.g., Have you restricted activities?” (yes/no)]. Among questionnaires, the Activity Restriction Scale (Williamson & Schulz, 1992) ($n = 8$) was the common instrument to assess activity restriction.

Effect Size Results

Results of our random-effects model are presented in Figure 2. The overall random-effects estimate of the relationship between activity restriction and depression was 0.39 (95% CI, 0.34–0.44). In addition to a large effect size, the fail-safe N was 12,541 as per Rosenthal’s formula (Rosenberg, 2005; Rosenthal, 1979). Egger’s regression test (Egger, Smith, Schneider, & Minder, 1997) to identify potential publication bias was not significant ($B = 1.55$, $SE = 0.95$, $t = 1.64$, $p = .110$).

Significant variability in effect sizes was found among the 34 studies ($Q = 206.30$, $df = 33$, $p < 0.001$). Results of our follow-up heterogeneity analyses revealed 2 significant moderators. First, variability in effect sizes was explained by study population ($Q = 73.02$, $df = 2$, $p < .001$), with the greatest effect size occurring among medical patients ($r = 0.45$; 95% CI, 0.42–0.48; 19 studies), followed by caregivers ($r = 0.34$; 95% CI, 0.28–0.41; 8 studies) and community-dwelling adults ($r = 0.28$; 95% CI, 0.25–0.31; 7 studies). Post-hoc analyses indicated that the effect size for medical patients was significantly greater than that of caregivers ($Q = 9.79$, $df = 1$, $p = 0.002$) and community-dwelling subjects ($Q = 72.83$, $df = 1$, $p < 0.001$). The effect size for caregivers was not significantly different from that of community-dwelling subjects ($Q = 3.23$, $df = 1$, $p = 0.073$). Finally, significant heterogeneity existed within the medical patients group ($Q = 103.48$, $df = 18$, $p < .001$) and the community-dwelling group ($Q = 16.15$, $df = 6$, $p = .01$), but not the caregiver group ($Q = 13.65$, $df = 7$, $p = .058$).

The quality of the AR assessment also explained variability in effect sizes ($Q = 30.54$, $df = 2$, $p < 0.001$), in which the correlation between activity restriction and depression was 0.39 (95% CI, 0.35–0.44) in the 13 studies with the highest quality AR assessment, 0.43 (95% CI,

0.40–0.47) for the 10 studies of middle quality, and 0.31 (95% CI, 0.28–0.34) among the 11 studies with lowest AR quality. Post-hoc analyses indicated that effect sizes for middle ($Q = 27.34$, $df = 1$, $p < 0.001$) and highest quality ($Q = 9.94$, $df = 1$, $p = 0.002$) AR assessment differed significantly from lowest quality studies. However, the effect sizes of middle and highest quality studies did not differ ($Q = 1.83$, $df = 1$, $p = 0.176$). A Spearman correlation between our medical status variable and our AR quality variable was $-.18$ ($p = 0.314$), indicating that the quality of AR measures was not significantly different in studies of medical patients relative to other populations. Within the subsets, significant heterogeneity existed in the low quality AR group ($Q = 78.41$, $df = 10$, $p < .001$) and the medium quality AR group ($Q = 80.01$, $df = 9$, $p < .001$), but not the high quality AR group ($Q = 17.33$, $df = 12$, $p = .138$). Finally, to investigate whether differences in effect sizes across study populations may have been due to differences in AR assessment quality, we examined the frequency with which each study population group used high quality AR assessments. Results indicated that 31.6% of medical population studies used “high quality” AR assessments, compared to 87.5% of caregiver studies and 0% of community-dwelling studies.

Results of our meta regression analyses indicated that year of publication ($Q = 0.06$, $df = 1$, $p = 0.815$), gender ($Q = 0.07$, $df = 1$, $p = 0.787$), and age ($Q = 3.58$, $df = 1$, $p = 0.058$) were not significant predictors of effect size.

DISCUSSION

This meta analysis provides evidence for a strong relationship between restriction of social and recreational activities and increased severity of depressive symptoms, in support of the activity restriction model of depressed affect (Williamson, 2000; Williamson & Shaffer, 2000). Interestingly, although behavioral models of depression have been well-known over the past 4 decades, examination of the relationship between activity restriction and depression is relatively new. In fact, half of the articles described in our analyses were published since 2006, and nearly one-third were published in 2009–2010. This increase in research attention likely coincides with the continued aging of the U.S. population, and an increased awareness of the impact of medical illnesses associated with aging on the emotional health of patients and their families. Indeed, over 75% of the studies included in this meta-analysis had samples with a mean age ≥ 55 years, and nearly half had a mean sample age ≥ 65 years.

The mean correlation between activity restriction and depressive symptoms across the 34 studies was 0.39, and this effect varied across selected moderators. Results of our secondary analyses indicated that the activity restriction/depressive symptoms relationship was strongest among medical patient populations, with an average effect size of 0.45. A particularly important aspect of this finding is that depressive symptoms are a known predictor of poor clinical outcomes in a variety of medical populations. For example, elevated symptoms of depression have been associated with 5-year, event-free chance of survival among patients with cancer (Watson, Haviland, Greer, Davidson, & Bliss, 1999), a 2-fold risk of emergency room visits and 29% increase in total health care costs in patients with heart failure (Rutledge, Reis, Linke, Greenberg, & Mills, 2006), and increased risk for morbidity and mortality among those with coronary artery disease (Burg, Benedetto, Rosenberg, & Soufer, 2003; Burg, Benedetto, & Soufer, 2003). Further, elevated depressive symptoms have been linked to functional decline (Lenze et al., 2005) and poorer rehabilitation outcomes in medical patients (Lenze et al., 2004; Lenze et al., 2007). Although these results suggest that depression plays a role in negative health outcomes, it is still unclear whether this relationship is causal in nature. Still, demonstration that activity restriction may be a significant contributor to depressive symptoms in medical patients

suggests that psychosocial/behavioral therapies, such as behavioral activation therapy, which emphasize re-engagement in pleasurable activities, may be particularly efficacious in these populations and may aid in producing residual benefits to health, well-being, and rehabilitation outcomes. Indeed, behavioral activation therapy, relative to other efficacious treatments for depression, specifically targets activity restriction through its emphasis on activating the patient toward engaging in more pleasurable activities (Jacobson, Martell, & Dimidjian, 2001).

An important limitation of the secondary moderator analyses is that significant heterogeneity existed within some of the moderator groups. For the study population moderator, studies conducted with medical patients and community-dwelling adults displayed significant heterogeneity in effect size. Although the moderator analysis suggests that medical populations exhibit a stronger relationship between AR and depression overall, the heterogeneity within this group means that it cannot be assumed that AR will be an equally effective target for depression intervention for all types of medical patients. Some of the heterogeneity within the medical patient group may be because patients with a wide variety of medical problems were studied (e.g., cancer, osteoarthritis, limb amputation, chronic pain). Effect sizes for the relationship between AR and depression may differ across these subgroups of medical populations. For example, it appears that effect sizes were generally smaller for patients with osteoarthritis and larger for medical populations such as cancer patients; however, there were too few studies investigating each individual medical condition to examine each of these subgroups separately. It is also notable that, although the variation among illnesses was broad among medical patients, some common conditions were not represented. For instance, no studies focusing on patients with cardiovascular diseases, such as heart failure, were included in this review, despite the association with these illnesses and both depression and activity restriction. Therefore, these findings may not be applicable across the range of medical conditions. Future research might examine additional moderators to determine which subsets of medical populations display stronger relationships between AR and depression. Additional moderators should also be investigated in the population of community-dwelling individuals, which also displayed significant heterogeneity in effect sizes in this analysis.

Likewise, for quality of AR assessment, there was significant heterogeneity in the low quality AR assessment group and the medium quality AR assessment group, potentially impacting post-hoc analyses. Given that there was not significant heterogeneity in the high quality AR assessment group, these results possibly reflect the higher reliability in higher quality AR assessments. This observation suggests that future studies may benefit from the use of higher quality assessment of AR.

Additionally, to examine whether the larger effect size in medical patients as compared to caregiving and community-dwelling populations was related to differences in AR assessment quality, we examined the frequency with which each study population group used high quality AR assessments. Studies with medical patients did not use higher quality AR measures relative to studies with caregivers. However, studies with community-dwelling populations were less likely to use high quality AR measures than studies in medical patient or caregiver populations. Therefore, the lower effect size for the relationship between AR and depression observed in community-dwelling samples must be interpreted with caution, as this decreased effect size may be a result of poor quality AR measurement. This finding further reinforces the need for using high quality assessments of AR in future research, especially in community-dwelling populations.

A strong relationship between activity restriction and depression was also observed among caregivers of medical patients, with a mean effect size of 0.34. Indeed, high rates of

depression have been observed in caregivers (Mahoney, Regan, Katona, & Livingston, 2005; Schulz, O'Brien, Bookwala, & Fleissner, 1995), and depressive symptoms have been reported to increase caregivers risk for cardiovascular illnesses (Mausbach, Patterson, Rabinowitz, Grant, & Schulz, 2007) as well as emergency department visits and hospitalization (Schubert et al., 2008). However, empirically validated treatments for reducing distress in caregivers exist (Gallagher-Thompson & Coon, 2007), and many emphasize re-engagement in pleasurable activities and reduction of activity restriction as a primary treatment target.

As the studies reported here were cross-sectional, it is important to note that the direction of the relationship between activity restriction and depression may be bidirectional. It is possible that activity restriction may contribute to the onset of depression, and that, once depressed, a variety of symptoms (e.g., depressed mood, insomnia, anergia) may maintain or further worsen activity restriction. Indeed, Lewinsohn and colleagues (Lewinsohn & Graf, 1973) have posited that loss of contact with positive reinforcement and avoidance related behaviors combine to produce and maintain depression, and our meta-analysis provides evidence these fundamental behavioral processes may account for substantial degree of depression across populations experiencing different life stressors. Longitudinal research is needed to identify the critical periods in the activity restriction, depression, and disablement cycle in which to intervene, particularly the earliest point at which prevention of depression may be possible.

Nevertheless, the primary clinical implication of this study is that it may be advisable to screen for activity restriction in routine clinical encounters in addition to depression in their patients. This would serve not only to help determine risk for depression in those who are currently experiencing subsyndromal depression, but also aid in determining treatment options. Specifically, in patients with both depression and activity restriction, behavior therapies may be utilized in conjunction with medication treatments to reduce depression. In patients with high activity restriction but subsyndromal depressive symptoms, primary care providers may consider ongoing monitoring of depression and/or recommend depression-prevention therapies. As a note, we found that quality of activity restriction assessments explained variability in the activity restriction/depression relationship. Thus, we advise against basic assessment methods such as asking whether or not patients restricted activities, and suggest more psychometrically sound methods yet brief scales be utilized such as the Activity Restriction Scale (Williamson & Schulz, 1992).

In sum, activity restriction appears to be a significant correlate of depressive symptoms across a variety of populations, with largest effect in individuals with medical illnesses. More work is needed to delineate the mechanisms and direction of causality between activity restriction on depression, in order better inform interventions targeting sustaining activities and prevention of depression. Based on the results of this meta-analysis, we recommend routine assessment of activity restriction to determine possible risk for depression, and suggest that psychosocial treatments that address activity restriction may be utilized as an adjunct to medications for treating depressive symptoms.

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References

- American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4. Washington, DC: American Psychiatric Association; 2000. Text Revision, Trans

- Bailey R, Kaskutas V, Fox I, Baum CM, Mackinnon SE. Effect of upper extremity nerve damage on activity participation, pain, depression, and quality of life. *Journal of Hand Surgery*. 2009; 34A: 1682–1688. [PubMed: 19896011]
- Baumgarten M, Battista RN, Infante-Rivard C, Hanley JA, Becker R, Gauthier S. The psychological and physical health of family members caring for an elderly person with dementia. *Journal of Clinical Epidemiology*. 1992; 45(1):61–70. [PubMed: 1738013]
- Bax L, Yu LM, Ikeda N, Tsuruta H, Moons KGM. Development and validation of MIX: comprehensive free software for meta-analysis of causal research data. *BMC Medical Research Methodology*. 2006; 6(50)
- Beach SR, Schulz R, Yee JL, Jackson S. Negative and positive health effects of caring for a disabled spouse: Longitudinal findings from the caregiver health effects study. [225]. *Psychology and Aging*. 2000; 15(2):259–271. [PubMed: 10879581]
- Beck, AT.; Alford, BA. *Depression: Causes and treatment*. 2. Philadelphia: University of Pennsylvania Press; 2009.
- Benyamini Y, Lomranz J. The Relationship of Activity Restriction and Replacement With Depressive Symptoms Among Older Adults. *Psychology and Aging*. 2004; 19(2):362–366. [PubMed: 15222831]
- Bookwala J, Schulz R. A comparison of primary stressors, secondary stressors, and depressive symptoms between elderly caregiving husbands and wives: The caregiver health effects study. *Psychology and Aging*. 2000; 15(4):607–616. [PubMed: 11144320]
- Bookwala, J.; Yee, JL.; Schulz, R. Caregiving and detrimental mental and physical health outcomes. In: Williamson, GM.; Shaffer, DR., editors. *Physical illness and depression in older adults: A handbook of theory, research, and practice*. Dordrecht, Netherlands: Plenum; 2000. p. 93-131.
- Burg MM, Benedetto MC, Rosenberg R, Soufer R. Presurgical depression predicts medical morbidity 6 months after coronary artery bypass graft surgery. *Psychosomatic Medicine*. 2003; 65(1):111–118. [PubMed: 12554822]
- Burg MM, Benedetto MC, Soufer R. Depressive symptoms and mortality two years after coronary artery bypass graft surgery (CABG) in men. *Psychosomatic Medicine*. 2003; 65(4):508–510. [PubMed: 12883097]
- Cameron JI, Franche R, Cheung AM, Stewart DE. Lifestyle interference and emotional distress in family caregivers of advanced cancer patients. *Cancer*. 2002; 94:521–527. [PubMed: 11900237]
- Carstensen LL, Fung HH, Charles ST. Socioemotional selectivity theory and the regulation of emotion in the second half of life. *Motivation and Emotion*. 2003; 27(2):103–123.
- Carstensen LL, Pasupathi M, Mayr U, Nesselroade JR. Emotional experience in everyday life across the adult life span. *Journal of Personality and Social Psychology*. 2000; 79(4):644–655. [PubMed: 11045744]
- Charles ST, Mather M, Carstensen LL. Aging and emotional memory: the forgettable nature of negative images for older adults. *Journal of Experimental Psychology General*. 2003; 132(2):310–324. [PubMed: 12825643]
- Chemerinski E, Robinson RG, Kosier JT. Improved recovery in activities of daily living associated with remission of poststroke depression. *Stroke*. 2001; 32(1):113–117. [PubMed: 11136924]
- Chorpita BF, Yim L, Moffitt C, Umemoto LA, Francis SE. Assessment of symptoms of DSM-IV anxiety and depression in children: a revised child anxiety and depression scale. *Behaviour Research and Therapy*. 2000; 38(8):835–855. [PubMed: 10937431]
- Cooper, HM. *A guide for literature reviews*. 3. Vol. 2. New York, NY: Sage Publications; 1998.
- Curcio CL, Gomez F, Reyes-Ortiz CA. Activity restriction related to fear of falling among older people in the Colombian Andes mountains: are functional or psychosocial risk factors more important? *Journal of Aging and Health*. 2009; 21(3):460–479. [PubMed: 19318606]
- DeRoche K, Welsh M. Twenty-five years of research on neurocognitive outcomes in early-treated phenylketonuria: intelligence and executive function. *Developmental Neuropsychology*. 2008; 33(4):474–504. [PubMed: 18568900]
- Deshpande N, Metter EJ, Lauretani F, Bandinelli S, Guralnik J, Ferrucci L. Activity restriction induced by fear of falling and objective and subjective measures of physical function: a prospective cohort study. *Journal of the American Geriatrics Society*. 2008; 56(4):615–620. [PubMed: 18312314]

- Egede LE. Major depression in individuals with chronic medical disorders: prevalence, correlates and association with health resource utilization, lost productivity and functional disability. *General Hospital Psychiatry*. 2007; 29(5):409–416. [PubMed: 17888807]
- Egger M, Smith GD, Schneider M, Minder C. Bias in meta-analysis detected by a simple, graphical test. *BMJ*. 1997; 315(7109):629–634. [PubMed: 9310563]
- Frasure-Smith N, Lesperance F, Habra M, Talajic M, Khairy P, Dorian P, et al. Elevated depression symptoms predict long-term cardiovascular mortality in patients with atrial fibrillation and heart failure. *Circulation*. 2009; 120(2):134–140. [PubMed: 19564557]
- Gallagher-Thompson D, Coon DW. Evidence-based psychological treatments for distress in family caregivers of older adults. *Psychology and Aging*. 2007; 22(1):37–51. [PubMed: 17385981]
- Gauthier LR, Rodin G, Zimmermann C, Warr D, Moore M, Shepherd F, et al. Acceptance of pain: a study in patients with advanced cancer. *Pain*. 2009; 143(1–2):147–154. [PubMed: 19321264]
- Gillespie, CF.; Garlow, SJ.; Binder, EB.; Schatzberg, AF.; Nemeroff, CB. Neurobiology of mood disorders. In: Schatzberg, AF.; Nemeroff, CB., editors. *The American Psychiatric Publishing Textbook of Psychopharmacology*. 4. Washington, DC: American Psychiatric Publishing, Inc; 2009. p. 903-944.
- Hasin DS, Goodwin RD, Stinson FS, Grant BF. Epidemiology of major depressive disorder: results from the National Epidemiologic Survey on Alcoholism and Related Conditions. *Archives of general psychiatry*. 2005; 62(10):1097–1106. [PubMed: 16203955]
- Hedges, LV.; Olkin, I. *Statistical methods for meta-analysis*. New York: Academic Press; 1985.
- Hunter, JE.; Schmidt, FL. *Methods of meta-analysis: Correcting error and bias in research findings*. Newbury Park: Sage; 1990.
- Jacobson DL, Martell CR, Dimidjian S. Behavioral Activation treatment for depression: Returning to contextual roots. [191]. *Clinical Psychology: Science and Practice*. 2001; 8(3):255–270.
- Katz PP, Julian L, Omachi TA, Gregorich SE, Eisner MD, Yelin EH, et al. The impact of disability on depression among individuals with COPD. *Chest*. 2010; 137(4):838–845. [PubMed: 19933374]
- Katz PP, Yelin EH. Activity loss and the onset of depressive symptoms: Do some activities matter more than others? *Arthritis Rheum*. 2001; 44(5):1194–1202. [PubMed: 11352254]
- Kinney JM, Parris-Stephens MA, Franks MM, Norris VK. Stresses and satisfactions of family caregivers of older stroke patients. *The Journal of Applied Gerontology*. 1995; 14(1):3–21.
- Kovacs M. The Children's Depression Inventory (CDI). *Psychopharmacology Bulletin*. 1985; 21(4): 995–998. [PubMed: 4089116]
- Landreville P, Desrosiers J, Vincent C, Verreault R, Boudreault Vr. The role of activity restriction in poststroke depressive symptoms. *Rehabilitation Psychology*. 2009; 54(3):315–322. [PubMed: 19702430]
- Lenze EJ, Munin MC, Dew MA, Rogers JC, Seligman K, Mulsant BH, et al. Adverse effects of depression and cognitive impairment on rehabilitation participation and recovery from hip fracture. *International Journal of Geriatric Psychiatry*. 2004; 19(5):472–478. [PubMed: 15156549]
- Lenze EJ, Schulz R, Martire LM, Zdaniuk B, Glass T, Kop WJ, et al. The course of functional decline in older people with persistently elevated depressive symptoms: longitudinal findings from the Cardiovascular Health Study. *Journal of the American Geriatrics Society*. 2005; 53(4):569–575. [PubMed: 15817000]
- Lenze EJ, Skidmore ER, Dew MA, Butters MA, Rogers JC, Begley A, et al. Does depression, apathy or cognitive impairment reduce the benefit of inpatient rehabilitation facilities for elderly hip fracture patients? *General Hospital Psychiatry*. 2007; 29(2):141–146. [PubMed: 17336663]
- Lewandowski AS, Palermo TM, Kirchner HL, Drotar D. Comparing diary and retrospective reports of pain and activity restriction in children and adolescents with chronic pain conditions. *The Clinical Journal of Pain*. 2009; 25(4):299–306. [PubMed: 19590478]
- Lewandowski AS, Palermo TM, Peterson CC. Age-Dependent Relationships Among Pain, Depressive Symptoms, and Functional Disability in Youth with Recurrent Headaches. *Headache*. 2006; 46(4): 656–662. [PubMed: 16643561]
- Lewinsohn PM, Graf M. Pleasant activities and depression. *Journal of Consulting and Clinical Psychology*. 1973; 41(2):261–268. [PubMed: 4147832]
- Lipsey, MW.; Wilson, DB. *Practical Meta Analysis*. Thousand Oaks, CA: Sage; 2001.

- Lockenhoff CE, Carstensen LL. Socioemotional selectivity theory, aging, and health: the increasingly delicate balance between regulating emotions and making tough choices. *Journal of Personality*. 2004; 72(6):1395–1424. [PubMed: 15509287]
- Mahoney R, Regan C, Katona C, Livingston G. Anxiety and Depression in Family Caregivers of People With Alzheimer Disease: The LASER-AD Study. *American Journal of Geriatric Psychiatry*. 2005; 13(9):795–801. [PubMed: 16166409]
- Mather M, Carstensen LL. Aging and attentional biases for emotional faces. *Psychological Science*. 2003; 14(5):409–415. [PubMed: 12930469]
- Mausbach BT, Patterson TL, Grant I. Is depression in Alzheimer's caregivers really due to activity restriction? A preliminary mediational test of the activity restriction. *Journal of Behavior Therapy and Experimental Psychiatry*. 2008; 39(4):459–466. [PubMed: 18294613]
- Mausbach BT, Patterson TL, Rabinowitz Y, Grant I, Schulz R. Depression and Distress Predict time to Cardiovascular Disease in Dementia Caregivers. *Health Psychology*. 2007; 26(5):539–544. [PubMed: 17845105]
- McDonnall MC. Risk factors for depression among older adults with dual sensory loss. *Aging & Mental Health*. 2009; 13(4):569–576. [PubMed: 19629782]
- Moussavi S, Chatterji S, Verdes E, Tandon A, Patel V, Ustun B. Depression, chronic diseases, and decrements in health: results from the World Health Surveys. *Lancet*. 2007; 370(9590):851–858. [PubMed: 17826170]
- Murphy SL, Williams CS, Gill TM. Characteristics associated with fear of falling and activity restriction in community-living older persons. *Journal of the American Geriatrics Society*. 2002; 50(3):516–520. [PubMed: 11943049]
- Nieboer AP, Schulz R, Matthews KA, Scheier MF, Ormel J, Lindenberg SM. Spousal caregivers' activity restriction and depression: A model for changes over time. *Social Science & Medicine*. 1998; 47(9):1361–1371. [PubMed: 9783879]
- Parker K, Kirby RL, Adderson J, Thompson K. Ambulation of people with lower-limb amputations: relationship between capacity and performance measures. *Archives of Physical Medicine and Rehabilitation*. 2010; 91(4):543–549. [PubMed: 20382285]
- Parnellee PA, Harralson TL, Smith LA, Schumacher HR. Necessary and discretionary activities in knee osteoarthritis: do they mediate the pain-depression relationship? *Pain Medicine*. 2007; 8(5):449–461. [PubMed: 17661863]
- Pohjasvaara T, Vataja R, Leppavuori A, Kaste M, Erkinjuntti T. Depression is an independent predictor of poor long-term functional outcome post-stroke. *European Journal of Neurology*. 2001; 8(4):315–319. [PubMed: 11422427]
- Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*. 1976; 1(3):385–401.
- Reisinger EL, DiIorio C. Individual, seizure-related, and psychosocial predictors of depressive symptoms among people with epilepsy over six months. *Epilepsy & Behavior*. 2009; 15(2):196–201. [PubMed: 19303457]
- Rivard V, Cappeliez P. Perceived control and coping in women faced with activity restriction due to osteoarthritis: Relations to anxious and depressive symptoms. *Canadian Journal on Aging*. 2007; 26(3):241–254. [PubMed: 18668978]
- Rochat S, Bula CJ, Martin E, Seematter-Bagnoud L, Karmaniola A, Aminian K, et al. What is the relationship between fear of falling and gait in well-functioning older persons aged 65 to 70 years? *Archives of Physical Medicine and Rehabilitation*. 2010; 91(6):879–884. [PubMed: 20510978]
- Rosenberg MS. The file-drawer problem revisited: A general weighted method for calculating fail-safe numbers in meta analysis. *Evolution*. 2005; 59(2):464–468. [PubMed: 15807430]
- Rosenthal R. The file drawer problem and tolerance for null results. *Psychological Bulletin*. 1979; 86(3):638–641.
- Rovner BW, Casten RJ. Activity loss and depression in age-related macular degeneration. *American Journal of Geriatric Psychiatry*. 2002; 10(3):305–310. [PubMed: 11994218]
- Rutledge T, Reis VA, Linke SE, Greenberg BH, Mills PJ. Depression in heart failure a meta-analytic review of prevalence, intervention effects, and associations with clinical outcomes. *Journal of the American College of Cardiology*. 2006; 48(8):1527–1537. [PubMed: 17045884]

- Schubert C, Boustani M, Callahan C, Perkins A, Hui S, Hendrie H. Acute care utilization by dementia caregivers within urban primary care practices. *Journal of General Internal Medicine*. 2008; 23(11):1736–1740. [PubMed: 18690489]
- Schulz R, O'Brien AT, Bookwala J, Fleissner K. Psychiatric and physical morbidity effects of dementia caregiving: Prevalence, correlates, and causes. [12]. *The Gerontologist*. 1995; 35(6): 771–791. [PubMed: 8557205]
- Simon GE, VonKorff M, Barlow W. Health care costs of primary care patients with recognized depression. *Archives of General Psychiatry*. 1995; 52(10):850–856. [PubMed: 7575105]
- Van de Velde S, Bracke P, Levecque K, Meuleman B. Gender differences in depression in 25 European countries after eliminating measurement bias in the CES-D 8. *Social Science Research*. 2010; 39(3):396–404.
- van Haastregt JC, Zijlstra GA, van Rossum E, van Eijk JT, Kempen GI. Feelings of anxiety and symptoms of depression in community-living older persons who avoid activity for fear of falling. *American Journal of Geriatric Psychiatry*. 2008; 16(3):186–193. [PubMed: 18310549]
- Walters AS, Williamson GM. The role of activity restriction in the association between pain and depression: A study of pediatric patients with chronic pain. *Children's Health Care*. 1999; 28(1): 33–50.
- Walters GD. The heritability of alcohol abuse and dependence: a meta-analysis of behavior genetic research. *American Journal of Drug and Alcohol Abuse*. 2002; 28(3):557–584. [PubMed: 12211366]
- Watson M, Haviland JS, Greer S, Davidson J, Bliss JM. Influence of psychological response on survival in breast cancer: a population-based cohort study. *Lancet*. 1999; 354(9187):1331–1336. [PubMed: 10533861]
- Williamson GM. Extending the activity restriction model of depressed affect: Evidence from a sample of breast cancer patients. *Health Psychology*. 2000; 19(4):339–347. [PubMed: 10907652]
- Williamson GM, Schulz R. Physical illness and symptoms of depression among elderly outpatients. *Psychology and Aging*. 1992; 7(3):343–351. [PubMed: 1388854]
- Williamson GM, Schulz R. Activity restriction mediates the association between pain and depressed affect: A study of younger and older adult cancer patients. *Psychology and Aging*. 1995; 10(3): 369–378. [PubMed: 8527058]
- Williamson GM, Schulz R, Bridges MW, Behan AM. Social and psychological factors in adjustment to limb amputation. *Journal of Social Behavior and Personality*. 1994; 9(5):249–268.
- Williamson, GM.; Shaffer, DR. Physical illness and depression in older adults: A handbook of theory, research, and practice. Dordrecht, Netherlands: Kluwer Academic Publishers; 2000. The Activity Restriction Model of Depressed Affect: Antecedents and consequences of restricted normal activities; p. 173-200.
- Williamson GM, Shaffer DR, Schulz R. Activity restriction and prior relationship history as contributors to mental health outcomes among middle-aged and older spousal caregivers. *Health Psychology*. 1998; 17(2):152–162. [PubMed: 9548706]
- Williamson GM, Walters AS. Perceived impact of limb amputation on sexual activity: A study of adult amputees. *The Journal of Sex Research*. 1996; 33(3):221–230.
- Wilson, DB. Meta-analysis macros for SAS, SPSS, and Stata Version 6.1. Retrieved August 21, 2010, from <http://mason.gmu.edu/~dwilsonb/ma.html>
- Wilson MM, Miller DK, Andresen EM, Malmstrom TK, Miller JP, Wolinsky FD. Fear of falling and related activity restriction among middle-aged African Americans. *Journals of Gerontology, Biological Sciences and Medical Sciences*. 2005; 60(3):355–360.
- World Health Organization. The global burden of disease: 2004 update. 2008. Retrieved March 25, 2009, from <http://www.who.int/evidence/bod>
- Yesavage JA, Brink TL, Rose TL, Lum O, Huang V, Adey M, et al. Development and validation of a geriatric depression screening scale: a preliminary report. *Journal of Psychiatric Research*. 1982; 17(1):37–49. [PubMed: 7183759]
- Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica*. 1983; 67(6):361–370. [PubMed: 6880820]

Figure 1.
Flow Chart for Selection of Studies for the Meta Analysis

Figure 2.
Effect sizes and 95% confidence intervals among studies of associations between activity restriction and depression

Figure 3.
Regression tests for funnel plot asymmetry for the associations between activity restriction and depressive symptoms.

Table 1

Summary of Studies Included in Meta Analysis

	Studies of Medical Patients	n	Population	Measure of Activity Restriction	Measure of Depression	Mean Age (Range)	% Female
1	Bailey et al (2009)	49	Patients with upper extremity nerve damage	% of activities lost to injury	CESD	48.0 (*)	46.9
2	Gauthier et al (2009)	81	Patients with Cancer	Chronic Pain Acceptance Questionnaire (CPAQ)	CESD	55.2 (≥18)	60.5
3	Katz et al (2001)	344	Patients with Rheumatoid Arthritis	Loss of ≥10% of life activities	GDS-Short Form	57.0 (*)	*
4	Katz et al (2010)	449	Patients with COPD or Chronic Bronchitis	% of valued activities affected by illness	GDS-Short Form	* (55–75)	51.3
5	Landreville et al (2009)	197	Stroke Patients	Assessment of Life Habits (LIFE-H)	GDS	76.9 (65–95)	48.7
6	Lewandowski et al (2006)	77	Children with recurrent headaches	Functional Disability Inventory	Revised Child Anxiety and Depression Scale	12.1 (8–16)	49.4
7	Lewandowski et al (2009)	93	Children with pain	Children's Activity Limitation Interview	Revised Child Anxiety and Depression Scale	12.5 (8–16)	69.9
8	McDonnell et al (2009)	203	Patients with hearing and vision loss	Patient report of the number of activities he/she stopped participating in or had decreased participation	CESD	* (≥55)	53.2
9	Parker et al (2010)	52	Lower limb amputees	Trinity Amputation and Prosthesis Experiences Scales (TAPES)	CESD	55.2 (20–88)	21.2
10	Parmalee et al (2007)	369	Patients with Osteoarthritis	Average of 2 items: a) frequency of activity limitations in the past month (0–5), and b) count of the number of valued activities were given up completely (0–5)	CESD	67.9 (48–91)	64.0
11	Reisinger et al (2009)	319	Epileptic patients w/seizures	Single item, Activity restriction due to seizures, (rated 1–4)	CESD	43.2 (19–75)	50.5
12	Rivard et al (2007)	92	Patients with Osteoarthritis	Arthritis Impact Measurement Scale	HADS	72.1 (60–89)	100.0
13	Rovner et al (2002)	51	Patients with Macular Degeneration	Lost (vs. did not lose) activities due to impaired vision and also greatly missed those activities	CESD	81.3 (*)	73.0
14	Walters et al (1999)	73	Children with pain	Parents/caregivers rated extent to which illness caused normal activities to be restricted	Children's Depression Inventory (CDI)	11.4 (5–18)	38.0
15	Williamson et al (1992)	228	Medical outpatients	Activity Restriction Scale	CESD	72.0 (55–95)	68.9
16	Williamson (1994)	160	Limb Amputees	Activity Restriction Scale	CESD	65.4 (32–90)	31.9

		n	Population	Measure of Activity Restriction	Measure of Depression	Mean Age (Range)	% Female
17	Williamson et al (1995)	268	Cancer patients	Activity Restriction Scale	CESD	* (30–90)	51.0
18	Williamson (1996)	76	Limb amputees	Sexual Restriction (4- items)	CESD	* (29–84)	32.9
19	Williamson (2000)	95	Patients with Breast Cancer	Adapted SF-36 (To assess limitation to activities)	CESD	49.2	26–75
Studies of Caregivers							
20	Bookwala et al (2000)	138	Caregivers of disabled spouses men	Activity Restriction Scale	CESD (10-item)	75.8 (>=65)	51.2
21	Bookwala et al (2000)	145	Caregivers of disabled spouses women	Activity Restriction Scale	CESD (10-item)	75.8 (>=65)	51.2
22	Cameron et al (2002)	44	Caregivers of cancer patients	Caregiving impact scale	Profile of Mood States (POMS)	55.8 (*)	56.8
23	Kinney et al (1995)	78	Caregivers of stroke patients	Social Impact Scale	Symptoms Checklist (SCL-90R)	60.1 (27–81)	75.6
24	Mausbach et al (2008)	25	Caregivers of Alzheimer's patients	Activity Restriction Scale	CESD	68.1 (45–88)	76.0
25	Nieboer et al - Study 1 (1998)	127	Caregivers of medical patients	Impact of caregiving on 6 most important daily activities; spent less time due to caregiving (score 0–6)	HADS	70.1 (≥57)	64.6
26	Nieboer et al – Study 2	110	Caregivers of bypass operation patients	Activity Restriction Scale	CESD (10-item)	58.3 (*)	89.1
27	Williamson et al (1998)	75	Caregivers of cancer patients	Activity Restriction Scale	CESD	62.2 (37–79)	68.0
Studies of Community-dwelling adults							
28	Benyamini et al (2004)	423	Community-dwelling older adults	Single item, "Have you had to give up any physical or social activity in the past few years because of a medical limitation or any other constraint?" (yes/no)	CESD	76.6 (≥60)	66.0
29	Curcio et al (2009)	1,390	Older adults with fear of falling	Single item, "Do you think this fear has made you cut down on any activities that you used to do?" (yes/no)	GDS-Short Form	70.4 (>=60)	58.9
30	Deshpande et al (2008)	673	Older Adults	Survey of Activities and Fear of Falling in the Elderly (SAFE)	CESD	75.8 (≥65)	69.1
31	Murphy et al (2002)	456	Older adults	Single Item, "Has fear caused you to cut down activities?" (yes/no)	CESD	* (≥72)	81.6
32	Rochat et al (2010)	255	Older Adults	Single Item, "Because of your fear of falling, have you restricted any activities?" (yes vs no)	Yes to either question, 1) "During the past month, have you often been bothered by feeling down, depressed, or hopeless?" or 2) "During the past month, have you	68.1 (65–70)	73.8

		n	Population	Measure of Activity Restriction	Measure of Depression	Mean Age (Range)	% Female
					often been bothered by little interest or pleasure in doing things?"		
33	Van Haastregt et al (2008)	534	Older adults	Single item, "Do you avoid certain activities due to fear of falling?" (mild/severe)	HADS	77.6 (70–92)	72.0
34	Wilson et al (2005)	304	Community-living adults	Single item, "Has fear of falling made you avoid any activities?" (yes/no)	CESD	56.9 (49–65)	69.0

* Data unavailable from report