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The relationship of age, function and psychological distress in Multiple Sclerosis

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Summary

Age is related to less distress in several populations including people with multiple sclerosis (MS). One theory posits this is due to decreased emotional reactivity and better coping as people age and we attempted to test this theory in MS. We used a cross-sectional survey of 429 people with MS. Participants completed measures of physical and cognitive function, depressive symptoms and anxiety. Age moderated the relationship of physical function to distress such that decreased physical function was related to more distress in younger participants. Age moderated the relationship of cognitive function to depression such that decreased cognitive function was related to more depressive symptoms in younger participants. Age did not moderate the relationship of cognitive function and anxiety. The effect was only seen in women with MS, however there were fewer men in the sample. The results are consistent with the theory of decreased emotional reactivity and better coping with age. However, we were unable to test this in much older adults (75+ years of age).

Keywords

depression; anxiety; coping; multiple sclerosis

People with multiple sclerosis (MS) often experience depression or anxiety as sequelae of the illness (Dennison, Moss-Morris, & Chalder, 2009). Depression and anxiety can result from symptoms of MS such as cognitive changes and physical morbidity or from medications used to treat MS (Sadock, Sadock, & Ruiz, 2009). Several studies have found that depression and anxiety tend to decrease across adulthood both in the general population (Stone, Schwartz, Broderick, & Deaton, 2010) and in MS (Beal, Stuijbergen, & Brown, 2007). However, it is unclear whether depression and anxiety then begin to increase again in older age as people develop more comorbidities and experience even worse function (Mirowsky & Reynolds, 2000). One possible explanation for this age effect is that people develop better coping and emotion regulation strategies as they age (Urry & Gross, 2010). In this theory, people become less reactive to stress as they age and are better able to use

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coping strategies with age. In this study we tested this theory in a sample of people with MS hypothesizing that people might be better able to cope with functional changes with increasing age.

We examined the relationship of limited physical function and perceived cognitive function, known to predict distress in several populations, to depression and anxiety and whether age moderated this effect. If people do generally become better at coping with these changes as they age, the relationship of physical and cognitive function to depression and anxiety should be attenuated by older age. If this hypothesis is not correct, age will not moderate the relationship of physical or cognitive function with depression and anxiety or younger age will attenuate the relationship.

Methods

Participants and Procedures

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This study was conducted following approval from the institutional review board. A secondary data analysis was conducted on data collected by a telephone structured survey of people with MS. Participants were recruited from the Greater Northwest Chapter of the National MS Society. To be eligible, participants had to self-report an MS diagnosis by a physician, be at least 18 years of age and able to read and write English. People with Medicaid, living in rural areas, recently diagnosed with MS, diagnosed with progressive MS or who were male were intentionally over-recruited as these populations have not been as well studied in MS research. Between April and June 2011, the research team attempted to contact 3,000 members of this chapter with a self-reported diagnosis of MS, however only 2,089 were considered eligible based on standard definitions (American-Association-for-Public-Opinion-Research, 2011). Of that total, 550 consented to participate and participated in the survey (response rate 26%, cooperation rate 74%, refusal rate 9%).

Measures

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Participants provided demographic and disease information including age, gender, education, and type of MS. Two questions asked about need for help, one about unpaid help and the other paid help. Physical function was measured using the Patient Reported Outcomes Measurement Information System (PROMIS®) 11-item short form for users of mobility aids and depressive symptoms and anxiety were measured using PROMIS Profile, version 1 (Cella et al., 2010)) that consists of four items per construct. Each item is rated on a 1 to 5 scale and scores reflects self-reported physical morbidity and disability. Cognitive function was measured by the short form of the Neurological Quality of Life (NeuroQOL), general cognition scale, which has eight items rated on a 1 to 5 scale (Gershon et al., 2012). Item response theory based T-scores (mean of 50, standard deviation of 10) are generated with higher scores indicating better physical function, better cognitive function, more depression or more anxiety. The score of 50 represents the mean of the United States general population for PROMIS measures (matched to Census 2000 on age, gender and race/ethnicity (Liu et al., 2010)). The PROMIS and NeuroQOL instruments have shown good reliability and validity (Amtmann, Cook, Johnson, & Cella, 2011; Gershon et al., 2012).

Analytic Strategy

Hierarchical multiple regression was used to assess the interaction of age with function on psychological distress. Depressive symptoms and anxiety were the dependent variables. Controls (gender, education, time since diagnosis) were entered on the first step. Main effects of age and either physical or cognitive function were entered on the second step. The interaction of age with function was entered in the third step. Interval variables were centered before calculating the interaction term. A total of six regressions were run (physical function with depression and anxiety, needing help with depression and anxiety, cognitive function with depression and anxiety). Analyses were then run a second time dividing by gender.

Results

Due to missing data, 429 participants who completed the portions of the survey used in this study were included. The average participant was female (69.3%), middle aged (mean age 52.44, $SD=12.94$), Caucasian (92.0%) and in a long-term relationship (71.3%), consistent with previous samples of people with MS. Over a third had a bachelor's degree or higher (36.6%). Participants were on average 14.65 ($SD=9.79$) years since their MS diagnosis. 59.5% percent had relapsing-remitting MS. Mean physical function score was 41.28 ($SD=11.33$) and mean cognitive function score was 39.31 ($SD=9.36$), 1 SD worse than the general US population mean. Mean depression score was 52.92 ($SD=9.57$) and mean anxiety score was 52.95 ($SD=9.19$). Forty-eight percent needed help, either paid or unpaid.

For any combination of distress (depression or anxiety) and physical function (scale or needing help), age moderated the relationship of physical function to distress. See Table 1. All interaction terms were significant ($ps<.01$) and indicated that as age increased, the relationship between distress and physical function was attenuated. Figure 1 depicts this for anxiety and the needing help variable although the relationships were similar for depression and for anxiety with the PROMIS physical function scale. In Figure 1, the younger participants (darker bars) show a larger increase in anxiety when physical function is low (more help needed) compared to when it is higher (no help needed) while the older participants (lighter bars) show a much more modest increase in anxiety. For cognitive function, age only moderated the relationship with depression ($p<.05$) but not anxiety (see Table 1). When stratified by gender, the same relationships were seen in women ($n=298$, all $ps<.05$) but not in men ($n=131$, all $ps>.05$).

Discussion

This study examined the interaction of age with physical and cognitive function in predicting depressive symptoms and anxiety. The relationship of physical function and psychological distress was moderated by age such that physical function was less related to distress in participants who were older. Results were consistent between depressive symptoms and anxiety and were demonstrated with two measures of physical function. Age moderating the effect of cognitive function was only seen for depression and not anxiety. However, the effects were only seen in women but not men with MS.

The results support the hypothesis that people become less reactive to and better able to cope with physical changes as they age (Urry & Gross, 2010). For people with MS, decreases in physical function may be expected as one gets older and this could be the reason for reacting less to decreased physical function. Additionally, as people age they may have developed more ways to cope with and live with the symptoms of MS compared to younger adults. Developmental milestones may also play a role as people are generally more established in their careers by middle to older adulthood and younger adults may be more concerned about MS interfering with their work. As this effect was seen primarily in women, declines in physical function may either be unexpected or still distressing regardless of expectation for men.

Contributions and limitations of the study should be considered. Our sample did not contain sufficient participants over the age of 65 and we were unable to examine this in older age, only young and middle adulthood. This was also a cross-sectional sample and we were unable to examine the effects prospectively. Medication information was not collected for this sample. Although this effect was primarily seen in women but not men, this could have been due to the smaller number of men. Another limitation was the somewhat low response rate although we had a high cooperation rate. It is important to note that response rate alone does not determine survey quality (American-Association-for-Public-Opinion-Research, 2011). Despite the limitations, this study highlights that age may play a role in how people respond to and cope with MS. Future research should also consider gender differences in predictors of distress in this population, given that results were not replicated in men.

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Figure 1.

Relationship of age and needing health (physical function) on anxiety. For graphical purposes only, a median split was used for age to create two groups (older/younger). A continuous variable was used for age in the actual analyses.

Table 1

Results of multiple regressions. All models controlled for gender, education and time since MS diagnosis. Sample sizes ranged from 417 to 429.

Variable	Std. β	Unstandardized Coefficient	Standard Error	T-test	P-value	R ²	P-value
Regression 1: Depressive Symptoms							
Age	-.119	-.089	.041	-2.192	.029	.079	<.001
Needing help	.284	5.492	.895	6.135	<.001		
Age*Needing help	-.156	-3.029	.897	-3.377	.001	.024	.001
Regression 2: Depressive Symptoms							
Age	-.226	-.166	.042	-3.956	<.001	.099	<.001
Physical Function	-.348	-.294	.042	-6.953	<.001		
Age* Physical Function	.186	1.806	.453	3.986	<.001	.033	<.001
Regression 3: Depressive Symptoms							
Age	-.072	-.054	.039	-1.377	.169	.167	<.001
Cognitive Function	-.412	-.421	.046	-9.232	<.001		
Age*Cognitive Function	.101	1.022	.447	2.290	.023	.010	.023
Regression 4: Anxiety							
Age	-.144	-.082	.039	-2.067	.039	.045	<.001
Needing help	.208	3.858	.871	4.430	<.001		
Age*Needing help	-.122	-2.279	.874	-2.609	.009	.015	.009
Regression 5: Anxiety							
Age	-.190	-.134	.041	-3.254	.001	.056	<.001
Physical Function	-.254	-.205	.041	-4.951	<.001		
Age* Physical Function	.130	1.209	.446	2.710	.007	.016	.007
Regression 6: Anxiety							
Age	-.084	-.061	.035	-1.736	.083	.263	<.001
Cognitive Function	-.517	-.511	.041	-12.512	<.001		
Age*Cognitive Function	.046	.452	.401	1.126	.261	.002	.261