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Early-life risk factors for late-onset depression

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SUMMARY

Objective To assess differences between women with no history of depression (No MDD), early-onset depression (EOD), and late-onset depression (LOD) on psychosocial risk factors (marital conflict and lack of social support), neuroticism, and overall self-rated health.

Method Diagnostic data from a community-based longitudinal study of women at mean ages 39, 42, 48, and 59 was used to create three groups of women (No MDD, EOD and LOD). These groups were then compared on psychosocial, personality, and overall health risk assessed approximately 10 years prior to diagnosis.

Results There were no differences between the groups on marital conflict and social support. Those with EOD scored higher than those in the LOD and No MDD groups on neuroticism. Importantly, those with LOD reported poorer health than those with No MDD 10 years prior to diagnosis.

Conclusions These findings provide support for the notion that poor health and not psychosocial risk factors or neuroticism predispose otherwise healthy adults to developing depression for the first time in late-life. Copyright © 2006 John Wiley & Sons, Ltd.

KEY WORDS — late-life depression; late-onset depression; early-onset depression; psychosocial risk factors; neuroticism; health

INTRODUCTION

Although there is no consensus on what constitutes late-onset depression (LOD), a number of features have been identified that distinguish it from early onset depression (EOD). For example, vascular risk factors are higher in people with LOD (Baldwin and Tomenson 1995; O'Brien *et al.*, 1996). Deep white matter hyperintensities on MRI are higher in those with LOD as compared to those with EOD (Krishnan *et al.*, 1997; Krishnan *et al.*, 2004). Patients with LOD and hyperintensity burden have also shown deficits on those neuropsychological tests including the executive functions (Salloway *et al.*, 1996). Such observations led to the hypothesis that some LOD occurs as a consequence of structural brain damage secondary to ischemia, which creates a vulnerability to depression in later-life characterized by executive dysfunction (Alexopoulos *et al.*, 1997; Krishnan *et al.*, 1997).

Little is known, however, about what social and personality factors might be associated with LOD. It has been found that people with EOD have higher levels of neuroticism (i.e. the long standing personality disposition to experience negative emotional states such as depression and anxiety) and parental depression whereas those with LOD have higher levels of life stress (Henderson *et al.*, 1997; Ormel *et al.*, 2001; Van den Berg *et al.*, 2001; Oldehinkel *et al.*, 2003). The LOD group in these studies, however, was not necessarily free of prior depressive episodes. These findings nevertheless suggest that those with EOD have a longstanding vulnerability to MDD whereas LOD may be associated with greater psychosocial risks in the years preceding onset of illness.

The purpose of this investigation was to determine whether psychosocial risk factors (e.g. marital conflict and social support), personality (e.g. neuroticism), and overall self-rated health assessed 10-years prior to

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depression diagnosis might differentiate between those with LOD, EOD, and No MDD. In particular, we expected the LOD group to score higher than the No MDD group on marital conflict and social support and evidence poorer self-rated health but we did not expect any differences between these groups on neuroticism. Compared to those with EOD, we expected the LOD group to evidence poorer self-rated health. We expected the EOD group to score higher on neuroticism than either of the other two groups, and for the EOD group to evidence poorer health, more marital conflict, and less social support than the No MDD group.

METHODS

Sample

This sample of 758 women, all of whom are mothers, first were assessed in 1983 when they were, on average, 39 years old (age range 21–62); participants were re-interviewed in 1986 (T_2), 1993 (T_3), and 2003 (T_4), at mean ages 42, 48, and 59, respectively. Study families were generally representative of families in the Northeastern United States with regard to socio-economic status and most demographic variables including race (91% Caucasian) at the time of initial testing. Retention rates for all three waves have been above 90%. Our website provides additional information on the sample (http://www.nyspi.cpmc.columbia.edu/ChildCom/index.htm). Informed consent was obtained prior to each interview in adherence with institutional guidelines.

Depression

Trained interviewers assessed lifetime depression (MDD) at T_3 and current MDD at T_4 using structured interview questions selected on the basis of correspondence with DSM criteria for MDD with the modification at T_3 that symptoms must have been present for at least one month. Following the identification of such an episode at T_3, age of onset was assessed by asking participants, 'How old were you the first time you had these symptoms'. Because of the age range of the present sample, we defined LOD as depression occurring for the first time after age 50.

Women with no history of depression at T_3 (1993) or T_4 (2003) were classified as No MDD. Women with an MDD diagnosis at T_3 were classified as having EOD if age of first onset at this time was less than 50 years of age, and LOD if age of onset was greater than or equal to 50 years of age. Women meeting criteria for MDD at T_4 were classified as having EOD if they were less than age 50. Women meeting criteria for MDD at T_4 with age greater than 50 were classified as LOD if they did not meet criteria for major depression at T_3. Applying this classification procedure to all women with diagnostic information at T_3 and T_4 resulted in a total sample of 724 women. Of these 724 women, 584 were categorized as having no history of depression (No MDD), 107 as meeting criteria for EOD, and 33 as meeting criteria for LOD.

Dependent variables

For No MDD women and for those classified as having EOD or LOD at T_3 (1993), we used T_1 (1983) data. For women classified as either EOD or LOD at T_4 (2003), we used T_3 (1993) data. Thus, we were able to maintain an approximately 10 year interval between assessment of risk factors (described below) and diagnosis of depression.

Social support was assessed with four questionnaire items indicating how often husband and wife (or closest friend) help each other when there is trouble, talk with each, are very affectionate with each other, and engage in outside interests together. Estimates of internal consistency were 0.81 in 1983 (T_1) and 0.83 in 1993 (T_3). Marital conflict with spouse, ex-husband, or step-father was assessed with three items indicating how often differences of opinion occur and how often arguing and yelling or 'rough stuff' occur. Estimates of internal consistency were 0.60 in 1983 (T_1) and 0.61 in 1993 (T_3).

Neuroticism refers to a chronic level of poor emotional adjustment, instability, and a tendency to experience aversive emotional states. The 22-item neuroticism scale was culled from a number of scales including those adapted from the anxiety and depression subscales of the Hopkins Symptoms Checklist, which were administered at each wave of the study. This 22-item scale consisted of items such as 'Feeling easily annoyed or irritated', 'Feeling fearful', 'Worrying or stewing about things', and 'Blaming yourself for things'. Internal consistency estimates were 0.91 and 0.94 for T_1 (1983) and T_3 (1993), respectively.

Overall health was self-reported on a scale ranging from 1 = very poor to 5 = excellent. Similar global health reports have been found to predict mortality and morbidity as well as functional ability, medical diagnoses, and physical and mental symptoms (Fayers and Sprangers, 2002). Such items are useful prognostic measures alongside other clinical outcomes,

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and are considered to be among the most important outcome variables (Fayers and Sprangers, 2002).

Data analysis

Analysis of Covariance (ANCOVA) was used to test for differences among the groups on overall health, marital conflict, social support, and neuroticism. Analyses of overall health and neuroticism adjusted for age where as analyses of marital conflict and social support adjusted for both age and marital status. Our age and marital status variables corresponded to the time of the assessment of the dependent variables. For example, if a respondent was classified as LOD at T_3 (1993), then we used their age and marital status from the 1993 assessment. Because of the proximity of Waves 1 (1983) and 2 (1986), we also substituted scores where appropriate to minimize the effect of missing data. Because responding to both the marital conflict and social support scales was conditional on marital status at the time of the assessment, we substituted means on these scales for women who were not married or did not have contact with their spouse or ex-spouse (Cohen *et al.*, 2003). Power transformations were also used on both marital conflict and social support to correct for skew. Significant *F*s associated with the group factor in these ANCOVAs were followed-up using least significant difference tests. Statistical significance was evaluated at the 5% level.

RESULTS

The means and SDs for the three groups are shown in Table 1. There are evident age differences among the groups, $F(2, 710) = 12.35$, $p > 0.0001$. Specifically, the LOD was older on average than both the No MDD group (mean difference = 5.44 years, $p > 0.0001$) and EOD group (mean difference = 6.64 years, $p > 0.0001$). There was also significant association between group and marital status, $\chi^2(2) = 5.39$, $p = 0.048$, driven by the higher percentage of unmarried women in the EOD group (OR = 1.76).

The estimated marginal means and *F*-values for univariate ANCOVAs are presented in Table 2. Contrary to expectations, there was no difference among the groups on either social support or marital conflict. The three groups did differ significantly on neuroticism, however [$F(2, 690) = 18.60$, $p > 0.0001$]. Those with EOD scored higher on neuroticism than those with LOD ($p > 0.029$) or No MDD ($p > 0.0001$). The difference between those with LOD and No MDD was not statistically significant ($p = 0.29$). The three groups also differed significantly on overall self-rated health [$F(2, 674) = 6.50$, $p > 0.002$]. Those with LOD scored lower on overall health than those with no history of depression ($p > 0.001$). There were also some trends. In particular, the EOD group scored lower on overall health than those with No MDD ($p = 0.064$) and higher on overall health than those with LOD ($p = 0.059$).

DISCUSSION

This study examined whether those with LOD, EOD, and No MDD could be distinguished on the basis of marital conflict, social support, neuroticism, and overall health assessed approximately 10 years prior to depression diagnosis. Contrary to expectations, there were no differences between the groups on marital conflict and social support. Those with EOD did score higher than the LOD and No MDD groups on neuroticism as expected. Importantly, those with LOD reported poorer health than those with No MDD

Table 1. Descriptive Statistics ($n = 724$)

Variable	Group		
	No MDD ($n = 584$)	EOD ($n = 107$)	LOD ($n = 33$)
Age	40.84 (6.84)	39.64 (6.41)	46.28 (6.16)
Percent not married	19	29	15
Marital conflict	1.50 (.45)	1.57 (.48)	1.61 (.32)
Social support	1.26 (.13)	1.29 (.15)	1.29 (.16)
Neuroticism	47.25 (10.85)	54.50 (11.57)	49.26 (11.63)
Overall health	4.23 (.71)	4.09 (.80)	3.78 (.97)

EOD = early-onset MDD (MDD onset prior to age 50); LOD = late-onset MDD (MDD onset after age 50); No MDD = no history of major depressive disorder.
For No MDD women and for those classified as having EOD or LOD at T_3 (1993), data were used from the T_1 (1983) assessment. For women classified as either EOD or LOD at T_4 (2003), data were used from the T_3 (1993) assessment.

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Table 2. Estimated marginal Means from ANCOVAs comparing No MDD, EOD, and LOD groups of social support, marital conflict, neuroticism, and overall health

Variable	No MDD	EOD	LOD	F
Social support	1.26	1.28	1.29	1.51 (2, 703)
Marital conflict	1.51	1.55	1.62	1.33 (2, 703)
Neuroticism	47.27[b]	54.45[a,c]	49.44[b]	18.60** (2, 690)
Overall health	4.24[c]	4.086[†]	3.80[a]	6.50* (2, 674)

Analyses for marital conflict and social support adjust for age and marital status; all other analyses adjust for age only. EOD = depression identified prior to age 50; LOD = depression identified after age 50. For No MDD women and for those classified as having EOD or LOD at T_3 (1993), data were used from the T_1 (1983) assessment. For women classified as either EOD or LOD at T_4 (2003), data were used from the T_3 (1993) assessment.

[a]Significantly different from No MDD group ($p < 0.05$).

[b]Significantly different from EOD group ($p < 0.05$).

[c]Significantly different from LOD ($p < 0.05$).

*$p < 0.01$

**$p < 0.001$

[†]Marginally different from No MDD and LOD ($p < 0.10$).

10 years prior to being classified as depressed and there was a trend for the LOD group to report poorer health as compared to those with EOD.

Two important findings emerge from this research. First, those with EOD scored higher than either the No MDD group or the LOD group on neuroticism, which is consistent with the longstanding psychobiological vulnerability to depression that has been reported in the literature (Brodaty *et al.*, 2001; Van den Berg *et al.*, 2001). Second, and perhaps more importantly, the only risk factor that differentiated those with LOD from those with No MDD was self-rated health. Although health was assessed subjectively and non-specifically, these findings provide support for the notion that medical burden predisposes those with no history of depression to depression in late-life and that this depression is not related to psychosocial risk factors or neuroticism. As previously discussed, the vascular depression hypothesis represents one possible mechanism for the onset of depression in late-life in the absence of any psychosocial or personality risk factors.

A number of limitations should be mentioned. Given the 10-year interval between assessment waves, it is possible that participants experienced a depressive episode between assessments. It is also possible that recall bias both with respect to lifetime MDD and age at onset may have affected our findings. We were also restricted to tests of overall, self-rated physical health rather than objectively rated and more specific indices of medical burden. The small number of participants meeting criteria for the LOD group suggests that these findings be viewed with caution. Because lifetime diagnosis of depression was not assessed until T_3, it is possible that depression in the earlier waves may have influenced responses to the dependent variables of interest. Although the women of this sample were all mothers, most women in our society marry and have children (Cherlin, 1999). Finally, the sample consisted primarily of White women, which was representative of the sampled region when they were first assessed.

In conclusion, these findings provide support for the notion that poor health and not psychosocial risk factors or neuroticism predispose otherwise healthy adults to developing depression for the first time in late-life. This is especially important given the high rates of medical burden conferred by obesity, high blood pressure, and high cholesterol in an increasingly aging population.

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