

5.2

Depression in Later Life: Emergence and Prognosis

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Introduction

Late-life depression is the subject of a separate side-study, which was designed within LASA from the very start of the project. The leading research questions of this side-study have been described in more detail elsewhere (Beekman et al. 1994) and are summarized in Table 5.1. So far, cross-sectional data from the first LASA cycle have been used to provide tentative answers to these research questions. As an introduction, the results will be summarized briefly below (the List of Publications 1991–1997 contains references to papers fully covering the results).

Table 5.1
Leading research questions in the LASA study on late-life depression

1. The prevalence of late-life depression in the population
2. The most important risk factors
3. The association between physical health and depression
4. The consequences of depression for older people
5. Service utilization
 - a. Provision of adequate treatment
 - b. Excess use of other health services

The present chapter is intended to provide an overview of the longitudinal data concerning late-life depression which is currently available within LASA. To start with, the structure of the data base is briefly described, with a focus on the additional data collected for the ancillary study concerning late-life depression. In the following

paragraphs there is a description of the findings concerning the emergence and the course of late-life depression. The chapter ends with a brief discussion of the findings.

A summary of findings derived from the baseline material

Depression was found to be a highly prevalent condition among the elderly in the Netherlands. Overall, 14.9% of the participants in the study were found to suffer clinically relevant depressive symptoms. The one-month prevalence of major depressive disorder, defined and diagnosed according to rigorous diagnostic criteria, was estimated at 2.02%. The prevalence of all other depressive syndromes (collectively referred to as minor depression) was estimated at 12.9%. A review of the literature showed that these figures are very similar to findings of earlier studies in other countries, based on similar methods.

With regard to risk factors, it was concluded that age and sex are not, in themselves, important risk factors. Moreover, although aging is associated with major shifts in the prevalence of risk factors, aging does not change the impact of risk factors. When considered separately, it was found that the profile of risk factors associated with major depression is very different from that of minor depression. Cross-sectional data suggest that major depression is a chronic intermittent disorder, with roots in longstanding personal vulnerability factors. In contrast, minor depression appears to be more strongly associated with stresses which are commonly found in older people, such as declining physical health and personal losses.

The consequences of late-life depression were studied in detail, suggesting an enormous impact on well-being and daily functioning. Both major and minor depression were associated with high levels of disability and handicap. From an economic and public health point of view, the high level of service utilization associated with depression may be considered to be alarming. It was found that depressed older people do not withdraw from the health services. However, when controlling for other, competing reasons for the use of health services, the evidence for excess service utilization was less compelling. Finally, the available data suggest that, although the vast majority of depressed older people do consult their GP regularly, treatment is initiated only rarely. This was taken as evidence confirming the lack of adequate management of late-life depression in general practice, which has been frequently reported in other studies.

Apart from the data on prevalence, which are necessarily based on cross-sectional material, the results presented above must be interpreted with due caution. Cross-sectional data are prone to various potential weaknesses, including (1) contamination of data (report and recall bias, depressed subjects systematically over or under-

reporting risk factors), (2) time-order problems (inaccurate dating of events, precluding the establishment of whether or not the risk factor has preceded the onset of the disorder), and (3) bias favoring chronic cases (depressive episodes with a short duration are less likely to be included).

Therefore, longitudinal data are necessary to draw firm conclusions with regard to the major research questions listed in Table 5.1, except for the question of prevalence. In the following paragraphs, the objectives and preliminary results of the studies pertaining to the incidence and the prognosis of depression will be described briefly.

Table 5.2
Flow-chart of data-collection

1992–1993	LASA baseline interview (CES-D) n=3107 LASA medical interview (DIS) depressed cohort n=331 non-depressed cohort n=329
<i>Interval</i>	<i>Five-monthly mail-back questionnaires (CES-D) depressed cohort n=328 + non-depressed cohort n=324</i>
1995–1996	LASA main interview – second cycle (CES-D) n=2204 LASA medical interview – second cycle (DIS) restricted to 65+, depressed cohort + new cases
<i>Interval</i>	<i>Five-monthly mail-back questionnaires (CES-D) depressed cohort + new cases</i>
1998–1999	LASA main interview – third cycle (CES-D) LASA medical interview – third cycle all participants depression side-study + new cases

Methods: a description of the data-base

As is illustrated in Table 5.2, the side-study involves a detailed follow-up of both depressed and non-depressed subjects, over a period of at least six years. A self-report assessment of depressive symptoms (Center for Epidemiologic Studies Depression Scale (CES-D), Radloff 1977, Beekman et al. 1994, 1997) was included in the main LASA interview. This ensured a measurement of depression in all partici-

pants at three-yearly intervals. A formal diagnostic interview (Diagnostic Interview Schedule DIS, Robins et al. 1981), yielding DSM-III (Diagnostic and Statistical Manual of Mental Disorders) diagnoses of affective disorders, was held with all subjects at risk. The results of validating the CES-D, both in the pilot studies and with the LASA baseline data, indicated that only subjects who achieved or exceeded the generally accepted CES-D cut-off score (>16) need to be clinically interviewed (the sensitivity for major depressive disorder was 100%). During all three LASA cycles, diagnostic interviews were administered in separate interviews, scheduled two to four weeks after the main interview. Screening and diagnosis was never carried out by the same interviewer.

As three-yearly intervals are considered to be too far apart to adequately determine either the onset (in those not initially depressed) or the course of depression (in those who were initially depressed), two cohorts were followed up in more detail. All subjects who were depressed at the time of the baseline interview, and all new cases encountered in subsequent LASA main interviews were asked to participate in the five-monthly mailback questionnaire study. The questionnaire provides measurements of depression (the CES-D), physical health, major environmental and interpersonal changes and basic measurements of service utilization. During the first three-year interval between LASA baseline data-collection and the second main interview, a large, randomly selected group of non-depressed subjects was included in the study, in order to obtain data on the 'normal' fluctuation of depressive symptomatology and the incidence of depression.

Table 5.3
Depression at 'baseline' and three years later

	baseline ¹ (1992-93)	baseline ²	second cycle (1995-96)
n	3056	2200	2200
average CES-D score	8.0 (7.89)	7.51 (7.52)	7.98 (7.83)
% probably depressed (CES-D >16)	14.9%	13.9%	15.0%

1. Total baseline sample with valid data

2. Baseline sample restricted to those with valid data at second measurement

Tables 5.3 and 5.4 summarize the elementary findings of the study, comparing the data derived from the first and the second cycles of the main interview. Considering the cross-sectional findings reported previously, one would expect a modest increase

in the prevalence of depressive symptoms over the three-year interval (there was a modest, but significant linear association between age and depression, and many of the risk factors found to be important become more prevalent with age, Beekman et al. 1995). At first sight, comparing the results across both measurements suggests that there is no change: both the average CES-D scores and the percentage of subjects who are probably depressed are similar (first and third columns of Table 5.3). However, this does not take into account the fact that the study was following a survivor cohort. When the analyses are restricted to data which are available from both measurements, there is a modest, but significant increase in depressive symptoms over time (second and third columns in Table 5.3, paired t-test $p < .01$).

Table 5.4 shows the emergence, persistence and remission of depressive symptoms across the three-year interval. Of those not depressed at baseline, 8.8% were depressed three years later. Of those depressed at baseline, approximately 50% had recovered at the time of the second interview, while 50% were still (or again) depressed. These findings are strikingly similar to the results of previous studies based on similar methodology, but different inter-measurement intervals. This suggests that there is an equilibrium in the population of both the incidence and the remission of depression. Of those depressed, approximately 50% suffer from chronic or chronic intermittent depression, while the other 50% recover. However, there is a lack of more detailed data on the natural history of depression, derived from population samples of elderly people. The results of the mail-back study will provide such data.

Table 5.4
Emergence, persistence and remission over the three-year period

	1995-96 not depressed	1995-96 depressed	Total
1992-93 not depressed			
n	1730	186	1916
% row	90.3%	9.7%	
1992-93 depressed			
n	141	143	284
% row	49.6%	50.4%	
Totals	1871	329	2200

Table 5.5
Baseline factors predicting emergence of depression over a three-year period

A: DEMOGRAPHIC VARIABLES

Risk factor (baseline)	Incidence 1995-96	OR (95% CI)	chi-square/MH
Sex			
male	6.0%	2.04 (1.45-2.86)	***
femal	11.5%		***
Age			
55-64 years	6.1%		***
65-74 years	9.3%		
75-85 years	12.0%		
Marital status			
married	6.9%	1.99 (1.44-2.75)	***
not/no longer married	12.9%		
Urbanization	8 levels 5.5%-11.9%		MH**
Place of residence			
outside Amsterdam	7.7%	1.65 (1.17-2.31)	***
in Amsterdam	12.1%		
Level of education			
intermediate/high	6.6%	2.00 (1.44-2.76)	***
lower	12.3%		

MH: Mantel Haenszel test for linear associations; OR: odds ratio; CI: confidence interval;
*** $p < 0.001$

B: HEALTH STATUS

Risk factor (baseline)	Incidence 1995-96	OR (95% CI)
Perceived health		
excellent/good	5.5%	3.32 (2.40-4.61)
fair/poor	16.3%	
Functional limitation		
none	5.9%	2.81 (2.02-3.89)
one or more	14.9%	
Chronic diseases		
none	5.9%	1.92 (1.33-2.76)
one or more	10.7%	
Cognitive status		
MMSE > 23	8.3%	1.72 (1.09-2.71)
MMSE < 23	13.5%	

OR: odds ratio; CI: confidence interval; MMSE: mini mental state examination

C: SOCIAL SUPPORT AND NETWORK RELATED-VARIABLES

Risk factor (baseline)	ANOVA	R
Size of network	***	0.102
Instrumental support received	ns	
Instrumental support given	**	0.063
Emotional support received	ns	
Emotional support given	ns	
Loneliness	***	0.143

ANOVA: analysis of variance; R: variance explained; ** $p < 0.01$;
 *** $p < 0.001$; ns: not significant

D: LONG-TERM VULNERABILITY FACTORS

Risk factor (baseline)	Incidence 1995–96	OR (95% CI)	ANOVA	R
Raised in harmonious family				
yes	7.5%	1.20 ns		
no	8.9%			
Catastrophic events early in life				
none	8.5%	1.12 ns		
one or more	9.4%			
Catastrophic events in WWII				
no	8.4%	1.11 ns		
yes	9.3%			
Family history major depression				
negative	9.5%	0.45%		
positive	4.4%			
Personal history major depression				
negative	8.2%	1.72 ns		
positive	13.3%			
Locus of control				
external			***	0.161

OR: odds ratio; CI: confidence interval; ANOVA: analysis of variance; R: variance explained;
 WWII: World War II; ns: not significant; *** $p < 0.001$

Results: the emergence of late-life depression

The results concerning the emergence of depression are presented in Tables 5.5A through 5.5D. The study sample was restricted to subjects who were not depressed at baseline. Within this sub-sample, the predictive power of various risk factors, as

measured at baseline, were assessed by means of bivariate analyses. As is shown, all demographic variables and all health variables under study were strong predictors of emerging depression after three years. A number of the social network and support variables measured at baseline (a smaller network, providing less instrumental support and loneliness) significantly predicted the emergence of depression. In contrast with what was found in the analyses of the cross-sectional material, long-term vulnerability factors, such as catastrophic events in early life or during World War II, a family history or even a personal history of depression were not associated with a newly emerging depression. An external locus of control was the only vulnerability factor significantly associated with an emerging depression three years later. The strong association between physical health at baseline and emerging depression probably explains why the older old are almost twice as vulnerable as the young old, and why age appears to have a linear association with the incidence of depression. Perceived health, loneliness and locus of control are three variables which are very sensitive to contamination, if measured simultaneously with depression. The present data show that all three variables, measured independently of, and long before the outcome, and studied in a group of subjects who were not depressed at baseline, strongly predict emerging depression.

Table 5.6
Baseline factors predicting chronicity of depression over a three-year period

A: DEMOGRAPHIC VARIABLES

Risk factor (baseline)	Chronicity (%)	OR (95% CI)	chi2/MH
Sex			
male	36.8%	1.89 (1.12-3.18)	***
female	52.4%		
Age			
55-64	40.7%		*
65-74	40.7%		
75-85	59.6%		
Marital status			
married	44.6%	1.24 ns	ns
not/no longer married	50.0%		
Urbanization	8 levels (13.0%-63.0%)		MH ns
Place of residence			
outside Amsterdam	43.6%	1.47 ns	ns
in Amsterdam	53.1%		
Level of education			
medium/high	43.1%	1.40 ns	ns
lower	51.4%		

MH: Mantel Haenszel test for linear associations; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$;
OR: odds ratio; CI: confidence interval; ns: not significant

B: HEALTH STATUS

Risk factor (baseline)	Chronicity	OR (95% CI)
Perceived health		
excellent/good	41.8%	1.41 ns
fair/poor	50.3%	
Functional limitations		
none	39.8%	1.75 (1.06–2.86)
one or more	53.7%	
Chronic diseases		
none	39.4%	1.54 ns
one or more	50.0%	
Cognitive status		
MMSE >23	45.9%	1.30 ns
MMSE ≤23	52.4%	
Major depression in previous year		
no	42.5%	1.81 ns
yes	57.1%	

CI: confidence interval; MMSE: mini mental state examination; ns: not significant

C: SOCIAL SUPPORT AND NETWORK-RELATED VARIABLES

Risk factor (baseline)	ANOVA
Size of network	ns
Instrumental support received	ns
Instrumental support given	ns
Emotional support received	ns
Emotional support given	ns
Loneliness	ns

ANOVA: analysis of variance; ns: not significant

D: LONG-TERM VULNERABILITY FACTORS

Risk factor (baseline)	Chronicity	OR (95% CI)	ANOVA	R
Raised in harmonious family				
yes	45.2%	1.16 ns		
no	48.9%			
Catastrophic events in early life				
none	43.1%	1.47 ns		
one or more	52.7%			
Catastrophic events in WWII				
no	40.7%	1.55 ns		
yes	51.5%			
Family history major depression				
negative	46.8%	0.82 ns		
positive	41.8%			
Personal history major depression				
negative	42.2%	1.56 ns		
positive	53.3%			
Locus of control				
external			***	0.24

OR: odds ratio; CI: confidence interval; ANOVA: analysis of variance; R: variance explained; ns: not significant; WWII: World War II; *** $p < 0.001$

Results: the course of late-life depression

The results of the analyses, assessing the role of various potential prognostic factors, are summarized in Tables 5.6A through 5.6D. For the purpose of these analyses, the study sample was restricted to subjects who were depressed at baseline. Again, in bivariate analyses, baseline characteristics of the respondents were assessed with respect to their prediction of remission versus persistence of depression, as measured three years later.

Considering the results, it is striking that many of the variables predicting emergence, do not predict the outcome of depression. The only demographic variables predicting the persistence of depression were female sex and older age. The only health variable predicting persistence was the presence of functional limitations at baseline. None of the other demographic or health-related variables were significant predictors of the outcome in subjects who were depressed at baseline. This includes the diagnosis at baseline: those fulfilling the diagnostic criteria for major depressive disorder in the year preceding the baseline interview were slightly more at risk for persistent depressive symptoms (57% versus 43%), but this difference did not reach

statistical significance. The modest age-difference found was restricted to the oldest old (60% persistence), versus the rest (41% persistence in both other age-groups). This could be due to the rising level of functional impairment with age. None of the social support or network-related variables, and only one of the personal vulnerability factors (locus of control), predicted persistence of depression.

Discussion

The results provide support for the vulnerability-stress model, in so far as it is used to explain the emergence of symptoms. However, long-term vulnerability factors seem less important than they did earlier, based on cross-sectional data. This might be because chronic depressive episodes were over-represented in the cross-sectional material. As all variables were measured at baseline, and as changes in important factors, such as changes in physical health, cognitive functioning and the structure and functioning of the network were not included, the present results should be considered as preliminary. Moreover, as the results are limited to bivariate associations, confounding due to the inter-relatedness of competing risk factors cannot be excluded. However, the long-term vulnerability factors are, by definition, not expected to change between measurements, indicating that their role is probably adequately assessed by means of the present analyses. One exception to this is locus of control (or sense of mastery), which has been shown to be a far less stable characteristic of older people than previously assumed (see Smits, next chapter). Moreover, as was found in our earlier work which was based on the cross-sectional data, it might well be that when attention is directed to rigorously diagnosed major depressive disorder, the long-term vulnerability factors will prove to be of greater importance.

The results further suggest that subjects who are already exposed to adverse conditions at baseline, are more likely to develop depression later in life. This is suggested by the fact that less than optimal physical health, a smaller network and subjectively assessed factors, such as poor perceived health and loneliness measured at baseline, strongly predicted the emergence of depression three years later. Several explanations can be offered: that subjects who are exposed to adversity are at greater risk of experiencing more adverse circumstances, that depression is more likely to develop when subjects are exposed to adversity for a longer period of time, or simply a delayed effect of the risk factors under study. Of course, the restriction of the analyses to two measurements, with a long (three-year) interval, precludes drawing any firm conclusions as to the exact timing of events. In order to determine the true longitudinal development of depression, the inclusion of 'change variables' in the analyses and a more detailed investigation of the follow-ups in the mail-back study

will be necessary. The vulnerability-stress model can then be further examined, by means of multivariate analyses, including interaction terms in the models.

The vulnerability-stress model was not designed to explain the course of depression. The present results bear testimony to this. The only variables predicting persistence were female sex, old age, functional limitation and external locus of control. Again, including 'change variables', examining the more detailed follow-ups from the mail-back study, and extending the analyses will be necessary in order to develop a model for chronicity. The present results do not allow even a tentative formulation of such a model. As sound epidemiological models for chronicity are not available, further study in this area could produce fruitful results.

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