Functional disability and depression in the general population. Results from the Netherlands Mental Health Survey and Incidence Study (NEMESIS)

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Objective: Data on the temporal relationships between duration of depression and recovery and functional disability are sparse. These relationships were examined in subjects from the general population ($n = 250$) with newly originated episodes of DSM-III-R major depression.
Method: The Netherlands Mental Health Survey and Incidence Study is a prospective epidemiological survey in the adult population ($n = 7076$), using the Composite International Diagnostic Interview (CIDI). Duration of depression and duration of recovery over 2 years were assessed with a life chart interview. Functional disabilities were assessed with the MOS-SF-36 and with absence days from work.
Results: Functional disabilities and absence days in depressed individuals were not found to be associated with duration of depression. Functioning in daily activities improved with longer duration of recovery but social functioning not.
Conclusion: Functioning deteriorates by actual depressive symptomatology and comorbid anxiety but not by longer duration of depression. After symptomatic recovery, functioning improves to premorbid level, irrespective of the length of the depression. Improvements in daily activities and work can be expected with longer duration of recovery.

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Key words: major depression; recovery; duration; functional disability; general population

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Introduction

Consequences of depression are severe in terms of reduced well-being and functioning (1, 2), especially in occupational and social roles (3). Functional disability has been found associated with severity of depression (4–6) and synchrony of change in depression severity and the level of functional disability has been found. This implies that disability improves with a decrease of depressive symptoms but is pervasive and chronic when the depressive symptoms persist (3, 7). Little is known, however, about the temporal relationship between depression and functional disability (8). For instance, clinical experience suggests that persistence of depression leads to progressive deterioration in functioning which in turn may further hamper recovery. Empirical data on this association between functional disability and duration of depression, however, are lacking. Data on the association between duration of recovery and functional disability, on the other hand, are inconsistent. Furukawa et al. (9) found further amelioration in functioning with longer duration of symptomatic remission but in earlier studies (10, 11) this could not be demonstrated. Elucidating the associations between duration of a depressive episode and functional disability on the one hand and duration of recovery and functional disability on the other is of great clinical importance as there is increasing recognition that the outcome of treatment of depression should be addressed in

broader terms than improvement of symptoms (7, 12).

In a cohort with newly originated major depressive episode (MDE) from the general population, we found duration of a MDE to vary widely, with a median duration of 3 months and a chronicity rate (duration ≥24 months) of almost 20% (13).

Aim of the present study is to investigate what the effects are of duration of depression and duration of recovery on functional disability in a cohort of depressed individuals of the general population with newly originated MDE.

Material and methods

Sampling

Data were derived from the Netherlands Mental Health Survey and Incidence Study (NEMESIS). Methods are described in detail elsewhere (13, 14). Briefly, NEMESIS is a prospective psychiatric epidemiological survey in the Dutch adult general population (aged 18–64) with three waves in 1996 (T_0), 1997 (T_1) and 1999 (T_2). It is based on a multistage, stratified, random sampling procedure. In the first wave, sufficient data were gathered on 7076 persons, a response rate of 69.7%. At T_1, 1458 respondents (20.6%) were lost to attrition and at T_2, a further 822 (14.6%) were lost. A total of 4796 respondents were interviewed at all three waves. Psychopathology did not have a strong impact on attrition: at T_1 12-month agoraphobia [odds ratio (OR), 1.96] and social phobia (OR, 1.37), and at T_2 12-month major depression (OR, 1.37), dysthymia (OR, 1.80) and alcohol dependence (OR, 1.83), adjusted for demographic factors, were associated with attrition (15, 16).

Diagnostic instrument

Diagnoses of psychiatric disorders according to DSM-III-R (17) were based on the Composite International Diagnostic Interview (CIDI), Version 1.1 (computerised version; 18). The CIDI is a structured interview developed by the World Health Organization (19) which has been found to have acceptable inter-rater reliability and test–retest reliability for most diagnoses, including major depression (20). The following DSM-III-R diagnoses are recorded in the NEMESIS data set: schizophrenia and other non-affective psychotic disorders, mood disorders (bipolar disorder, major depression, dysthymia), anxiety disorders (panic disorder, agoraphobia, simple phobia, social phobia, generalized anxiety disorder, obsessive–compulsive disorder), eating disorders and psychoactive substance use disorders (alcohol or drug abuse and dependence, including sedatives, hypnotics and anxiolytics.

Study cohort

We included respondents with newly originated MDE (first or recurrent cases) between T_1 and T_2, i.e. those with a diagnosis of 2-year prevalence of major depression at T_2 but no 1-month prevalence of major depression diagnosis at T_1 ($N = 273$). Those diagnosed with bipolar disorder or a primary psychotic disorder were excluded. To examine the research questions the study cohort was split in two: those who were still depressed at T_2 (with a 1-month prevalence of major depression at T_2; $N = 69$) and those who have recovered at T_2 (without a 1-month prevalence of major depression at T_2; $N = 181$).

Outcome measures

Functional disabilities were assessed at T_2 with the Short-Form-36 Health Survey (SF-36; 21, 22), for which good reliability and validity have been demonstrated (23). The SF-36 consists of 36 items forming eight scales. Scoring was performed in accordance with the Ware & Sherbourne guidelines (21) on a 0–100 scale, with 100 defined as maximum functioning. Because we were interested in role functioning, we used the subscales 'role limitations due to emotional problems' (three items), which records problems with work or other daily activities in the previous 4 weeks as a consequence of emotional problems; and 'social functioning' (two items) which assesses limitations on social activities like visiting friends and relatives.

Sickness absence in weeks between T_1 and T_2 was assessed at T_2 for respondents with (partial) employment between T_1 and T_2.

Independent variables

Duration of depression and duration of recovery were assessed retrospectively at T_2, using the Life Chart Interview (LCI) (24). To improve recall, we used memory cues such as personal events, birthdays or holidays in the past 2 years. Psychopathology was assessed over periods of 3 months and for each period we recorded:

- duration of depressive symptoms (less than half/half/most/whole of the 3-month period). For the analysis this was computed as 0.75 month/1.5 month/2.25 months/3 months;

- severity of depressive symptoms (no or minimal severity/mild/moderate/severe/very severe). This was dichotomized as 'no or minimal severity' vs. 'at least mild severity'. Only periods with more than minimal severity were used in the analyses.

Duration of depression was calculated by adding up the duration of each 3-month period with depressive symptoms in the 2-year period of observation, starting from the first period of 3 months with depressive symptoms. A distinction was made between persistent course of depression in the 2 years of observation and a relapsing course with periods of 3 months with depressive symptoms alternating with periods of 3 months without depressive symptoms.

Duration of recovery was calculated by adding up each 3-month periods without depressive symptoms until T_2, starting from the last period of 3 months with depressive symptoms in the 2 years of observation.

Because administration of the LCI was time consuming and not relevant for the entire NEMESIS sample, and because interviewers were not aware of DSM-III-R diagnoses derived from the CIDI, the use of the LCI was made dependent on a probe question (PQ) about whether the respondent had felt depressed for any period of more than 2 weeks since T_0.

In the study cohort, 23 (8.4%) of the 273 respondents did not respond affirmatively to the PQ. No significant differences were found between PQ-positive and PQ-negative responders on socio-demographic and clinical variables. There were 10 respondents who responded affirmatively to the PQ but reported no 3-month period of depressive symptoms. We classified these as having had MDE of brief duration and set this duration arbitrarily at 0.5 months.

Co-variates

Gender, age were recorded at T_0. Employment status was recorded at T_2 because sickness absence (one of the outcome measures) was dependent on the employment status between T_1 and T_2.

Premorbid functioning was determined at T_1 by the assessment of the subscales 'role limitations due to emotional problems' and 'social functioning' of the MOS-SF-36.

Number of comorbid somatic disorders. This was assessed at T_2 with a questionnaire listing 31 mostly chronic somatic conditions for which respondents had been treated in the preceding 24 months.

Clinical factors. Using the CIDI, we obtained information on the following: severity of the index depressive episode (mild, moderate, severe with or without psychotic features according to the DSM-III-R) and comorbidity with other DSM-III-R axis I disorders. We calculated psychiatric comorbidity without applying the hierarchical DSM rules. The comorbid disorders deemed relevant were dysthymia and anxiety disorders. Furthermore, using the LCI, a persistent or relapsing course of depression between T_1 and T_2 was assessed.

Statistical analyses

The bivariate associations between duration of depression and recovery on the one hand and both premorbid functioning and the outcome measures on the other were analysed using ANOVA.

Bivariate regression analyses were performed to assess the association of duration of depression or duration of recovery, age and gender, employment status, premorbid functioning, persistent or relapsing course of depression between T_1 and T_2, severity of the index episode, psychiatric and somatic comorbidity with the outcome measures. The variables found significant ($P \leq 0.05$) were entered in a multiple regression model (method stepwise $P_{in} = 0.05$, $P_{out} = 0.1$) with age, gender and duration of depression or duration of recovery to asses the best fitted model.

Results

Study cohort

The mean age of the entire study cohort ($N = 250$) was 41.7 years (SD = 10.7); 66.8% were female and 73.6% were employed. For those who were still depressed at T_2 ($N = 69$), the mean duration of their depression in 2 years prior to T_2 was 7.1 months (SD = 6.5) and median duration 4.5 months. For those who had recovered at T_2 ($N = 181$), the mean duration of their recovery over the 2-year follow-up period was 7.2 months (SD = 7.8) and median duration 5.0 months (not in Table).

In both cohorts, functioning was significantly impaired at T_1 compared with the total NEMESIS-sample but no differences were found between the two cohorts (Table 1). At T_2, functioning in both cohorts was still significantly impaired compared with the NEMESIS sample but in the still depressed cohort significantly more than in the recovered cohort. Both cohorts had significantly more absence days than in the NEMESIS sample, with most sickness days in the still depressed

Table 1. Functional status and sickness absence over a 2-year period in two cohorts with newly developed major depressive episodes from the general population (one cohort with still depressed individuals at T_2, and one cohort with recovered individuals at T_2) and in the total NEMESIS sample

Functioning	Depressed at T_2 (1) $N = 69$	Recovered at T_2 (2) $N = 181$	NEMESIS (3) $N = 4796$	F	P
Role limitations due to emotional problems, mean (SD)					
T_1	80.9 (34.2)	76.0 (38.1)	92.7 (22.5)	62.58	<0.001*1
T_2	48.3 (41.8)	77.0 (38.1)	93.9 (20.9)	257.84	<0.001*2
Social functioning, mean (SD)					
T_1	78.8 (18.5)	78.8 (22.4)	89.5 (17.1)	51.17	<0.001*1
T_2	57.1 (24.2)	78.7 (21.6)	89.4 (17.2)	175.91	<0.001*2
	$N = 48$	$N = 136$	$N = 3327$		
Sickness absence between T_1 and T_2, weeks (SD)	11.9 (18.3)	7.9 (14.8)	2.8 (8.6)	56.26	<0.001*2

*1 3 ≠ 1,2; *2 1 ≠ 2 ≠ 3.

Table 2. Functional status and sickness absence over a 2-year period in a still depressed cohort at T_2 with newly developed major depressive episodes from the general population with a persistent course of depression and relapsing course of depression

Functioning	Persistent course $N = 41$	Relapsing course $N = 28$	F	P
Role limitations due to emotional problems, mean (SD)				
T_1	85.8 (32.8)	73.8 (35.6)	2.07	0.16
T_2	55.3 (42.6)	38.1 (39.2)	2.89	0.09
Social functioning, mean (SD)				
T_1	79.8 (17.6)	77.3 (19.9)	0.30	0.59
T_2	58.5 (25.3)	55.2 (22.9)	0.31	0.58
	$N = 30$	$N = 18$		
Sickness absence between T_1 and T_2, weeks (SD)	14.0 (19.6)	8.4 (15.6)	1.03	0.32

cohort. No significant differences were found in functioning in the still depressed cohort between those with a persistent course of depression ($N = 41$) and those with a relapsing course of depression ($N = 28$) (Table 2).

Duration of depression

In the still depressed cohort, functional disability and sickness absence at T_2 were analysed with differential duration of depression in the 2 years of observation (Table 3). No significant differences in limitations in daily activities and social functioning were found between groups with differential duration of depression. Sickness absence increased, although not significant, with duration of depression ≥6 months.

In bivariate analyses only comorbid anxiety was significantly associated with limitations in daily activities at T_2: ($\beta = -0.28$, SE = 9.79, $P = 0.02$). The multivariate model with comorbid anxiety, duration of depression and age and gender included only comorbid anxiety ($\beta = -0.28$, SE = 9.79, $P = 0.02$) with $R^2 = 0.05$.

Severity of the index episode ($\beta = -0.27$, SE = 3.33, $P = 0.03$) and comorbid anxiety ($\beta = -0.30$, SE = 5.66, $P = 0.02$) were bivariate significantly associated with social functioning at T_2. Only comorbid anxiety ($\beta = -0.29$, SE = 5.66, $P = 0.02$) remained in the multivariate model with $R^2 = 0.08$.

For those with employment ($n = 48$), none of the variables were significantly associated with duration of sickness absence.

Table 3. Functional status and sickness absence by differential duration of depression over a 2-year period in a still depressed cohort with newly developed major depressive episodes from the general population ($N = 69$)

	Duration of depression in months					
Functioning	≤3 $N = 31$	3–6 $N = 11$	6–12 $N = 13$	12–24 $N = 14$	F	P
Role limitations due to emotional problems T_2, mean (SD)	54.8 (43.5)	30.3 (37.9)	43.6 (43.9)	52.4 (38.6)	0.77	0.51
Social functioning T_2, mean (SD)	62.3 (23.6)	59.3 (27.8)	50.0 (21.9)	50.7 (24.1)	1.21	0.32
	$N = 17$	$N = 7$	$N = 11$	$N = 13$		
Sickness absence between T_1 and T_2, weeks (SD)	8.6 (15.2)	3.7 (5.5)	15.4 (25.0)	17.9 (19.0)	1.23	0.31

Table 4. Functional status and sickness absence by differential duration of recovery over a 2-year period in a recovered cohort with newly developed major depressive episodes from the general population ($N = 181$)

	Duration of recovery in months					
Functioning	≤3 (1) $N = 73$	3–6 (2) $N = 26$	6–12 (3) $N = 39$	12–24 (4) $N = 43$	F	P
Role limitations due to emotional problems T_2, mean (SD)	62.1 (42.4)	83.3 (36.8)	95.7 (17.4)	81.4 (35.9)	8.18	<0.001*1
Social functioning T_2, mean (SD)	73.2 (22.8) $N = 48$	79.2 (21.9) $N = 22$	88.5 (14.9) $N = 30$	79.0 (21.9) $N = 36$	4.53	<0.001*2
Sickness absence between T_1 and T_2, weeks (SD)	4.2 (10.5)	5.2 (7.4)	15.1 (26.6)	3.7 (9.0)	5.40	0.01*3

*1 1 ≠ 3,4; *2 1 ≠ 3; *3 3 ≠ 1,4.

Duration of recovery

In the recovered cohort significant differences in daily activities were found at T_2 between groups with differential duration of recovery. Worse functioning in daily activities was found in those with shorter duration of recovery (Table 4). In addition, significant differences in social functioning were found at T_2 between those with a duration of recovery ≤3 months and those with a duration of recovery 6–12 months.

Significant differences in sickness absence were found with highest sickness absence in those with a duration of recovery of 6–12 months.

In bivariate analyses duration of recovery ($\beta = 0.23$, SE 0.41, $P = 0.00$), being employed ($\beta = 0.17$, SE = 6.47, $P = 0.02$) and comorbid anxiety ($\beta = -0.15$, SE = 6.14, $P = 0.05$) were all significantly associated with limitations in daily activities at T_2. In a multivariate model with these determinants and age and gender, duration of recovery ($\beta = 0.23$, SE = 0.41, $P = 0.00$) and comorbid anxiety ($\beta = -0.15$, SE = 6.0, $P = 0.04$) both remained in the model with $R^2 = 0.08$.

Social functioning at T_2 was significantly associated with social functioning at T_1 ($\beta = 0.19$, SE = 0.07, $P = 0.01$) and the multivariate model included only social functioning at T_1 with $R^2 = 0.04$.

For those with employment ($N = 136$) only severity of the index episode ($\beta = 0.23$, SE = 1.45, $P = 0.01$) was significantly associated with duration of sickness absence and the multivariate model was the same with $R^2 = 0.05$.

Discussion

This is the first report on the associations of functional disability with duration of depression and duration of recovery in a cohort with newly developed major depressives episodes from the general population. Contrary to the clinical experiences, we did not find an association between duration of depression and functional disability in depressed individuals. In a subsequent analysis, severity of depression and comorbid anxiety were found as the strongest contributors to dysfunctioning in depressed individuals, as was found earlier (3, 7). Functioning in daily activities improved with a longer duration of recovery but social functioning did not. This suggests a differential effect of duration of recovery on different domains of functioning.

Our findings support the notion of synchrony of change: worse functioning was found in actually depressed individuals and functioning improved after recovery of depression. We also found some evidence that dysfunctioning precedes a depression. This was demonstrated earlier in older populations (25) indicating bidirectional effects of depression and functioning (8). Furthermore, residual effects on functioning after recovery could be demonstrated, as was found earlier in clinical cohorts (26) and in the general population (27, 28). Our results suggest that functional disability is relatively stable and chronic. Disability increases during a depressive episode and, after a symptomatic recovery, returns to a (already impaired) premorbid level.

The non-association between duration of depression and dysfunctioning we found may be the result of a methodological shortcoming of the study. The main outcome variables, the MOS subscales, were assessed at T_2 over the preceding 4 weeks. A repeated assessment of disability during the depressive episode would probably have given a better impression of changes in functioning.

Sickness absence was substantial in both still depressed and recovered individuals. However, no significant associations between duration of depression and sickness absence were found. A possible explanation for this finding is that our estimation of sickness absence of longer duration might be inaccurate as a sick leave exceeding 12 months is usually grounds for medical retirement in the Netherlands.

The major strengths of our study is that we included individuals with newly originated depressive episodes, which enabled us to assess baseline functioning before the depressive episode. Furthermore, duration of depression and duration of recovery were carefully assessed with a life chart method. A limitation is that our follow-up was only 2 years. There is some evidence that a duration of depression, exceeding the 2 years, leads to more functional disability (2). Another limitation of the method employed is that duration of depression and duration of recovery were retrospectively assessed with the LCI. However, we believe that this method of assessment of duration, with a combination of prospectively (CIDI) and retrospectively (LCI) obtained data, is the best feasible for general population surveys.

Although we could not demonstrate a powerful effect of duration on functional disability, our findings give no reason to underestimate the consequences of a longer duration of depression. Depression is associated with severe limitations in functioning, and each extra month in depression prolongs the suffering.

The implications of our findings for clinicians are important. We demonstrated that functioning deteriorates dramatically by actual depressive symptomatology and comorbid anxiety. After symptomatic recovery, functioning improves to premorbid level, irrespective of the length of the depression. Functioning in daily activities and work increases with longer duration of recovery. These findings should urge clinicians to treat depressive symptomatology (and comorbid anxiety) aggressively, even in depressed patients with a protracted duration of illness.

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