

## ORIGINAL PAPER

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## Risk factors and psychosocial consequences in depression of octo- and nonagenarians: results of an epidemiological study

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**Abstract** In a two-wave community study in Munich, Germany, a representative sample of 402 people older than 85 years was restudied 1 year later. In the first cross section a total of 358 (89.1%) subjects were interviewed. One year later 263 (73.5%) subjects were reexamined. Several diagnostic systems were used. The probands showed a high prevalence of depression – nearly one quarter of the interviewees. In this extreme age group gender differences in depression were minimal. Depressives were distinctly impaired in daily life. Depressive probands were more often found in institutions than in private households. Depressives were high users of the medical care system, but very rarely treated by specialists. Need for care and certain specific especially threatening life events were identified as risk factors for depression.

**Key words** Epidemiological study · Depression in octo- and nonagenarians · Prevalence · Risk factors

### Introduction

With the increasing longevity of the population in future years health problems will make an increasing impact on public health. Klerman (1978) and Schwab (1979) state that in contrast to the age of anxiety that followed the Second World War, we will now be entering an age of melancholy. Most knowledge about depression results from inpatients or case registers. However, the use of psychiatric facilities implies the readiness of the depressed individual to adapt the sick role, one of the stages of illness behaviour that by definition refers to the varying perceptions, thoughts, feelings and acts affecting the personal and so-

cial meaning of illness and its consequences. Patients with a particular disease selected from an in- or outpatient population are usually not comparable with those in the general population suffering from the same disease but being partly untreated. This is particularly true for disorders with high prevalence, as the true prevalence is much higher than the treated prevalence. Weissman and Myers (1981) reported that only a relatively small proportion of the population with mental disorders actually receives treatment from any source, and that a relatively large number of depressed persons seek help from non-psychiatric medical care settings. General conclusions necessary for the planning of mental health services and the determination of risk factors can only be drawn from results of epidemiological studies conducted in the general population.

Many epidemiological community studies which address to the issue of mental health have covered relatively wide age ranges and contained only very small samples of people older than 85 years (Essen-Möller 1956; Nielsen 1962; Akesson 1991; Kay et al. 1970; Magnusson and Helgason 1981; Mölsä et al. 1982; Cooper and Sosna 1983). There are several prevalence studies based on community samples which have reported dementia and depression as the most prevalent mental disorders in the octo- and nonagenarians (Skoog 1993; Henderson 1993; Helmchen et al. 1996). The comparison of different epidemiological studies is complicated by the use of different diagnostic instruments and different case identification. In addition, sociocultural differences, differences in health care systems and different attitudes toward mental illness and treatment limit direct comparisons.

The identification of risk factors with the aim of prevention is another epidemiological intention.

The role of life events as risk factor for depression was examined in several studies (Emmerson et al. 1989; Hautzinger 1985; Kennedy et al. 1989, 1990; Krause 1988; Linn et al. 1980; Norris and Morrell 1987; Wilkinson et al. 1985). The total number of reported life events dramatically decrease with age (Markush and Favero 1974; Uhlenhuth 1983). There are, however, special risk factors such as widowhood, institutionalisation and need for care.

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Nevertheless, up to now there exist, to our knowledge, only rare studies dealing with the influence of life events in the octo- and nonagenarians.

The association of chronic illness, disability in the sense of restrictions in daily activity and depression is well known (Turner and Noh 1988; Welz et al. 1989; Cooper and Sosna 1983; Gurland et al. 1988). Helmchen et al. (1996) and Oswald et al. (1996) reported the want of knowledge about impairment of daily life in the different diagnostic groups in old people.

In this paper we try to determine the prevalence for depression in the octo- and nonagenarians in the community, to identify risk factors, such as sociodemographic factors, life events and need for care for depression in this age group, and to take into account psychosocial consequences caused by this mental disorder.

## Methods

### Sample

The sample was drawn from the community register of the city of Munich, Germany. On 5 June 1990, 20415 persons living in Munich were aged 85 years and older. The names and addresses of 2052 persons of this population could not be obtained because the data requested of subjects was not forwarded (for security reasons). The remaining population consisted of 18363 persons aged 85 years and older who were registered as residents of the city of Munich. Persons living in homes for the elderly were included. The sample of 402 persons was randomly drawn and approached for assessment and correlated very well to the remaining population of 18363 persons according to gender, age and living situation. Nevertheless, the problem exists that we have no information on 2052 persons (10%) of the population 85 years and older. The possible security reasons could include mental illness, biasing the representativity of our sample. Of the 402 persons, 358 (89.1%) were assessed in the first cross section in an examination conducted by physicians trained in psychiatry. Two persons (0.5%) could not be traced, 42 persons (10.4%) refused to participate. Of 358 persons assessed in the first cross section, 263 (73.5%) were reexamined 1 year later. Sixty-seven persons (18.7%) died before the second interview, 23 persons (6.4%) refused and 3 persons (0.8%) could not be traced. Two persons (0.6%) could not be interviewed because of bad health. Table 1 shows the sociodemo-

**Table 1** Sociodemographic characteristics of the sample assessed in both cross sections ( $t_1$ ,  $t_2$ )

	$t_1$ ( $n = 358$ )		$t_2$ ( $n = 263$ )	
	<i>N</i>	%	<i>N</i>	%
Gender				
Female	276	77.1	203	77.2
Male	82	22.9	60	22.8
Age				
Year of birth:				
1891–1900	91	25.4	56	21.3
1901–1905	267	74.6	207	78.7
Living situation				
Private household	257	71.8	188	71.5
Home	61	17.0	47	17.9
Nursing ward	40	11.2	28	10.6

graphic characteristics of the persons assessed in both cross sections.

### Instruments

The main instrument used to assess psychopathology was the Geriatric Mental State Interview (GMS-A; Copeland et al. 1976, 1986, 1987). This semistructured psychiatric interview covering the whole of psychopathology for the past 4 weeks was designed for the assessment of the elderly. The high sensitivity and specificity for organic as well as depressive disorders in the elderly had been reported. Results were analysed by the AGE CAT computer program (Automatic Geriatric Examination for Computer-Assisted Taxonomy) according to a certain algorithm developed by Copeland et al. (1986). The following diagnoses can be derived (the severity score ranges from 1 to 5: 0–1 = no case, 2 = subcase, 3–5 = case) on the basis of the AGE CAT computer program: Organic mental illness (dementia), depression (undifferentiated), depressive neuroses, depressive psychoses, hypochondriasis, anxiety neuroses, obsessive-compulsive neuroses, phobia and schizophrenia. The GMS finally offers only one main diagnosis, however, the possibility of several syndromes on the syndrome level. For the main diagnosis the severity of the symptoms and certain key symptoms were determined. In addition to the GMS-A the Hamilton Depression scale (HAMD; Hamilton 1967) was used for assessment of depressive symptoms for the whole sample. Siegfried et al. (1984) decided the following classification referring to the 21-item Hamilton Scale: Hamilton score  $\leq 18$  = depression,  $\geq 7$  no depression. For the purpose of our study the Hamilton scale was reduced: three items were omitted (work capacity, loss of libido, insight into illness, items of limited validity because of high age). We expected a high prevalence for cognitive impairment and dementia; insight into illness (especially in demented people) appeared at very limited validity and was consequently omitted. The scale points were reduced from 63 to 55 points. The cutoffs of Siegfried et al. (1984) were modified accordingly: Hamilton Score  $\geq 16$ : depression;  $\leq 6$ : no depression; 7–15: no assessment. Questions were used to assess demographic and biographic data. Illness behaviour in the mentally ill, consequences in daily life because of mental illness and instrumental social support assessed by self reports were analysed. We asked for several life events which had happened in the past 12 months. For every life event the time of happening was registered. The judgement of threat was an objective rating by the physicians according to the criteria of Brown (1978). All subjects received a physical examination. The research physician filled out a checklist concerning somatic health problems within the past 7 days and the past 12 months. Somatic illness was diagnosed according to ICD-9. The intensity and the cause of need for care was judged by the physicians. In addition to GMS-AGE CAT computer diagnosis cases with mental disorders were classified according to ICD-10 and DSM-III-R. For the diagnosis according to ICD-10 and DSM-III-R all information (of the proband, of relatives or caregivers, the judgement of the physician) was included, and the criteria of the classification system were used.

The GMS-A main diagnosis depression fit well with the medical judgement according to DSM-III-R and ICD-10 ( $\kappa \geq 0.6$ ). The GMS-A-AGE CAT program demonstrated a higher sensibility for depression. A lower degree of severity of depressive symptoms was sufficient for the diagnosis of depression. The Hamilton score confirmed this: depression according to GMS-A-main-diagnosis showed an average Hamilton score of 11.7, and according to DSM-III-R and ICD-10 of 13.3 and 13.2, respectively. Other studies showed partly better, partly worse accordance between medical judgement and GMS-A diagnoses ( $\kappa$  between 0.5 and 0.8; Copeland et al. 1976).

We decided to improve the case identification by certain criteria and to combine different instruments for a "project diagnosis" because of methodological difficulties, as the exact algorithm for the AGE CAT diagnosis was not completely known, the Hamilton Depression scale is used for the measurement of severity of depression and is not designated as diagnostic classification and the

DSM-III-R medical judgement had no standardised classification criteria. The time frame for all instruments covered the preceding 4 weeks before the examination.

Cases of depression were syndromatically classified according to the following criteria defined as project diagnosis:

1. GMS diagnoses with the exception of: (a) A false-negative diagnosis according to the GMS-A syndrome level is assumed if the Hamilton score shows less than 7 points, excluding an anxiety disorder. (b) A false-positive diagnosis according to GMS-A syndrome level is assumed if the Hamilton score does not amount to 16 points.
2. If there exists no GMS syndrome diagnosis because of missing data: Hamilton score.
3. If there exists neither GMS syndrome diagnosis nor Hamilton score: medical judgement according to ICD-10 and DSM-III-R.
4. By missing data of GMS syndrome diagnosis, Hamilton score and medical judgement: no assessment.

As we expected a high prevalence of cognitive impairment in our sample with consequent loss of memory, we abstained from lifetime morbidity and duration of mental illness.

#### Statistical methods

The significance tests were  $\chi^2$  test or Fisher's exact test.

Logistical regressions were done for estimating the relative risk for depression. Effects of age were adjusted, as several risk factors are correlated with age.

## Results

### Prevalence of depression according to different instruments and gender (Table 2)

According to the Hamilton score 9.9% of the sample, 9.8% of the females and 10.4% of the males, suffered from depression. Considering the project diagnosis 24.6% of the sample, 25% of the women and 23.5% of the men suffered from depression. The GMS-A AGECA

program diagnosed 23.6% of the sample, 22.3% of the women and 28.2% of the men as depressive. Of these depressions, 54.9% were classified as depressive neuroses and 45.1% as depressive psychoses. According to DSM-III-R diagnosis by medical judgement 18.7% of the sample, 17.6% of the women and 22.2% of the men were classified as depressive. Additionally, 8.8% of the sample suffered from organic depression. Considering different kinds of depression possible according to DSM-III-R (Table 3). Of the sample, 1.4% suffered from major depression, 5.1% from dysthymia and 5.7% from a depressive reaction. Of the sample, 5.9% suffered from depressive disorders that could not be classified.

Categorised in different age groups the depressive disorders are more likely to be present in the younger age group, independent of the different instruments (Table 4). Besides the prevalence rate of depression, the comorbidity of depression and dementia is of special interest.

According to the GMS syndrome level, of 82 subjects with the main diagnosis of depression 25 probands (30%) suffered from a demential syndrome of very slight degree (1–2) not fulfilling the criteria of caseness, and 4 probands (5%) showed a demential syndrome of degree 3–5. Additionally, 25.7% of the women and 24.4% of the men got the main diagnosis dementia according to the GMS-A-AGECAT program.

As already mentioned, the organic depression according to DSM-III-R was found in 8.8% of the interviewees and included, besides dementia, other organic diseases such as parkinson's disease. According to the DSM-III-R-diagnoses 20 women (7.4%) of 272 and 3 men (3.7%) of 81 got the diagnosis dementia with depression (290.21), and 2 women (0.7%) and 4 men (4.9%) the diagnosis of multiinfarct dementia with depression (290.43).

According to the project diagnosis we developed the diagnostic categories of only depression, only dementia,

**Table 2** Prevalence of depression according to different instruments and gender:  $t_1$  sample

	Female		Males		Total		$\chi^2$ test		
	N	%	N	%	N	%	$\chi^2$	df	p
GMS-A syndrome ( $n = 355$ )									
Depressive syndrome $\leq 2$	67	24.5	17	20.7	84	23.7			
Depressive neuroses 3–4	40	14.7	22	26.8	62	17.5			
Depressive psychoses 3–5	39	14.3	6	7.3	45	12.7			
No depression	127	24.5	37	45.1	164	46.2	8.183	3	0.42
GMS-A-AGECAT main diagnosis: Depression ( $n = 347$ )	60	22.3	22	28.2	82	23.6	1.166	1	0.280
Project diagnosis ( $n = 353$ ): Depression	68	25.0	19	23.5	87	24.6	0.080	1	0.777
Hamilton score ( $n = 323$ )									
$\geq 16$	24	9.8	8	10.4	32	9.9			
7–15	86	35.0	21	27.3	107	33.1			
0–6	136	55.3	48	62.3	184	57.0	1.581	2	0.453
DSM-III-R medical judgement ( $n = 353$ ): Depression	48	17.6	18	22.2	66	18.7	0.859	1	0.354
ICD-10 medical judgement ( $n = 353$ ): Depression	52	19.1	22	27.2	74	21.0	2.437	1	0.119

NOTE: Significance tests were Pearson's  $\chi^2$  test or Fisher's exact test

**Table 3** Prevalence of depression according to DSM-III-R diagnoses and gender:  $t_1$  sample

DSM-III-R	Female		Males		Total		$\chi^2$ test		
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	$\chi^2$	<i>df</i>	<i>p</i>
No depression	207	76.1	57	70.4	264	74.8	1.088	1	0.297
Major depression	5	1.8	—	—	5	1.4	Fisher's		0.593
Organic depression	24	8.8	7	8.6	31	8.8	0.003	1	0.960
Dysthymic disorder	14	5.1	4	4.9	18	5.1	Fisher's		1.000
Depressive reaction	12	4.4	8	9.9	20	5.7	Fisher's		0.095
Depressive disorder not categorized	16	5.9	5	6.2	21	5.9	Fisher's		1.000
Total	272	100.0	81	100.0	353	100.0			
Missing	4		1		5				

NOTE: Significance tests were Pearson's  $\chi^2$  test or Fisher's exact test

**Table 4** Prevalence of depression according to different instruments and age:  $t_1$  sample

	Age group year of birth				$\chi^2$ test		
	1891–1900		1901–1905		$\chi^2$	<i>df</i>	<i>p</i>
	<i>N</i>	%	<i>N</i>	%			
GMS-A syndrome							
Depressive syndrome $\leq 2$	27	30.3	57	21.4	4.216	3	0.291
Depressive neuroses 3–5	11	12.4	51	19.2			
Depressive psychoses 3–5	12	13.5	33	12.4			
No depression	39	43.8	125	47.0			
GMS-A-AGECAT main diagnosis	16	18.6	66	25.3	1.600	1	0.206
Project diagnosis	18	20.2	69	26.1	1.253	1	0.263
DSM-III-R medical judgement	9	10.1	57	21.6	5.679	1	0.016
ICD-10 medical judgement	12	13.5	62	23.5	4.019	1	0.045
Hamilton scale							
$\geq 16$	8	10.7	24	9.7	0.097	2	0.953
7–15	24	32.0	83	33.5			
0–6	43	57.3	141	56.9			

NOTE: Significance tests were Pearson's  $\chi^2$  test or Fisher's exact test

and dementia with depression besides other diagnosis. Of 353 probands, 187 subjects (52.9%) got no diagnosis, 63 subjects suffered from only depression (17%), 79 subjects from only dementia (22.4%) and 24 subjects from dementia with depression (6.8%). Data referring to the incidence of depression are presented in Meller et al. (1996).

#### Social consequences of depression

Four items (Jakubaschk 1978) tried to review the suffering from illness and the disturbance of social relations caused by the mental disorder. The results are based on the self-assessment of the interviewees. For comparison we differentiated in different diagnostic groups. Of the only depressed persons (according to the project diagnosis), 65.6% subjectively suffered from their mental disorder. Demented subjects reported only an augmented suffering from illness, if there existed additionally a depression (76.2%).

Of the depressives, 32.8% and 35% of the depressed and demented, tried to avoid social contacts because of illness.

Disturbances of social relations were most often reported by subjects suffering from dementia and depression. (Table 5).

The degree of impairment in daily life caused by mental illness was of special interest considering the need for care. All information (of the proband, of relatives or caregivers, the judgement of the physician) was taken into account.

Impairment in daily work, in management of financial transactions, in social activities and in leisure activities were most often found in only demented probands and probands with dementia and depression. Subjects with only depression were significantly less impaired, but even double impaired in comparison with mentally healthy subjects (Table 6). Data referring to the medical care and the illness behaviour of depressed subjects are presented in Meller et al. (1996).

In comparison with mentally healthy persons, depressed probands were more often in hospitals the year preceding the examination. The stay in hospital lasted longer. Depressives frequently consulted their general practitioner. Nevertheless, only 3.7% of the depressed

**Table 5** Psychosocial consequences because of mental disorders (self-assessment)

		Total	No mental disorder	Only depression	Only dementia	Dementia with depression	$\chi^2$	$p$
Suffering from illness								
No	$N$	247	160	21	61	5	100.67	0.00000
	%	73.3	88.9	34.4	83.6	23.8		
Yes	$N$	88	20	40	12	16		
	%	26.3	11.1	65.6	16.4	76.2		
Total	$N$	353	187	63	79	24		
	%	105.4	103.9	103.3	108.2	114.3		
Avoidance of contact								
No	$N$	296	174	41	68	13	43.35	0.00000
	%	87.6	95.1	67.2	91.9	65.0		
Yes	$N$	42	9	20	6	7		
	%	12.4	4.9	32.8	8.1	35.0		
Total	$N$	353	187	63	79	24		
	%	104.4	102.2	103.3	106.8	120.0		
Disturbance of primary relations								
No	$N$	303	178	49	63	13	31.63	0.00000
	%	91.0	97.8	86.0	85.1	65.0		
Yes	$N$	30	4	8	11	7		
	%	9.0	2.2	14.0	14.9	35.0		
Total	$N$	353	187	63	79	24		
	%	106.0	102.7	110.5	106.8	120.0		
Disturbance of secondary relations								
No	$N$	291	171	47	58	15	22.26	0.00006
	%	85.6	94.0	75.8	76.3	75.0		
Yes	$N$	49	11	15	18	5		
	%	14.4	6.0	24.2	23.7	25.0		
Total	$N$	353	187	63	79	24		
	%	103.8	102.7	101.6	103.9	120.0		

**Table 6** Impairment of daily life because of mental disorder (self-assessment)

		Total	No mental disorder	Only depression	Only dementia	Dementia with depression	$\chi^2$	p
Impairment of daily work								
No	<i>N</i>	7	4	2	1	0	107.90	0.00000
	%	2.0	2.2	3.3	1.3	0		
Yes	<i>N</i>	95	16	11	51	16		
	%	27.5	9.3	18.0	65.4	66.7		
Impairment of management of financial transactions								
No	<i>N</i>	7	4	1	1	1	111.57	0.00000
	%	2.0	2.2	1.6	1.3	4.3		
Yes	<i>N</i>	102	19	13	55	15		
	%	29.5	10.4	21.0	70.5	65.2		
Impairment of social activities								
No	<i>N</i>	8	5	2	1	0	116.63	0.00000
	%	2.3	2.7	3.3	1.3	0.0		
Yes	<i>N</i>	108	21	13	57	17		
	%	31.3	11.5	21.3	73.1	70.8		
Impairment of leisure activities								
No	<i>N</i>	9	5	2	2	0	128.84	0.00000
	%	2.6	2.7	3.3	2.6	0.0		
Yes	<i>N</i>	92	13	10	51	18		
	%	26.7	7.1	16.4	66.2	75.0		

**Table 7** Sociodemographic factors as risk factors for depression:  $t_1$  sample ( $n = 358$ )

	<i>N</i>	Depression		Odds ratio		
		<i>n</i>	%	Lower	95% CI	Upper
Age (years)						
85–89	264	69	26.1		1.0	
90+	89	18	20.2	0.40	0.72	1.29
				$G = 1.290, p = 0.2560$		
Gender						
Female	272	68	25.0		1.0	
Male	81	19	23.5	0.51	0.92	1.64
				$G = 0.085, p = 0.7704$		
Living situation						
Private household	254	55	21.7		1.0	
Institution	99	32	32.3	1.06	1.78	2.99
				$G = 4.614, p = 0.0317^*$		
Family state						
Married	66	20	30.4		1.0	
Single	286	67	23.4	0.40	0.72	1.31
				$G = 1.126, p = 2.885$		
Children alive						
No	132	32	24.2		1.0	
Yes	218	54	24.8	0.62	1.03	1.70
				$G = 0.011, p = 0.9146$		
Sister position						
First child	20	2	10.0		1.0	
Additional child	318	82	25.8	0.75	3.30	14.53
				$G = 3.328, p = 0.0681^+$		
Education						
Low	245	56	22.9		1.0	
High	105	30	28.6	0.82	1.37	2.31
				$G = 1.403, p = 0.2362$		
Confession						
No	14	6	42.9		1.0	
Yes	330	80	24.8	0.14	0.40	1.21
				$G = 2.459, p = 0.1169$		
Social class						
Upper/middle	137	35	25.5		1.0	
Lower	124	21	16.9	0.31	0.57	1.05
				$G = 3.320, p = 0.0684^+$		
Income						
≤ 1500 DM	121	34	28.1		1.0	
> 1500 DM	163	31	19.0	0.34	0.59	1.04
				$G = 3.322, p = 0.0684^+$		

NOTE: *N* sampling quantity, divergences from the complete *N* from 358 on account of missing data; *n* no. of depressions; % percentage of depressions in the group. Odds ratios on account of logistical regressions in adaptation of the age; *G* improvement of the deviance measure at taking up from the factors compared with the model with ageeffect; *df* 1 grade of scope; *p* probability of error about model improvement

\* $p < 0.05$

+ $p < 0.1$

persons sought help with a psychiatrist, and nobody was psychiatric inpatient. Only 9.5% of the actually depressed subjects were treated by antidepressant agents, and 52.4% of the depressed probands received benzodiazepines.

**Table 8** Live events and relative risk for depression

	<i>N</i>	Depression		Odds ratio		
		<i>n</i>	%	Lower	95% CI	Upper
Death of partner						
No	229	53	23.1		0.1	
Yes	8	5	62.5	1.16	5.4	21.97
				$G = 4.786, p = 0.0287^*$		
Death of child						
No	235	58	24.7		1.0	
Yes	2	0	0.0	2.27 <sup>-16</sup>	0.01	1.35 <sup>11</sup>
				$G = 1.233, p = 0.2669$		
Death of sister						
No	224	54	24.1		1.0	
Yes	13	4	30.8	0.41	1.40	4.75
				$G = 0.279, p = 0.5976$		
Death of relative						
No	219	53	24.2		1.0	
Yes	18	5	27.8	0.40	1.16	3.43
				$G = 0.075, p = 0.7844$		
Death of friend						
No	220	51	23.2		0.1	
Yes	17	7	41.2	0.79	2.20	6.11
				$G = 2.1835, p = 0.1397$		
Death of acquaintance						
No	223	55	24.7		1.0	
Yes	14	3	21.4	0.22	0.82	3.07
				$G = 0.087, p = 0.7682$		
Death of pet						
No	233	57	24.5		1.0	
Yes	5	1	20.0	0.09	0.83	7.71
				$G = 0.027, p = 0.8706$		
Own illness						
No	187	45	24.1		1.0	
Yes	50	13	26.0	0.54	1.10	2.25
				$G = 0.066, p = 0.7978$		
Illness of partner						
No	227	53	23.3		1.0	
Yes	10	5	50.0	0.82	2.98	10.78
				$G = 2.659, p = 0.1030$		
Illness of child						
No	229	57	24.9		1.0	
Yes	8	1	12.5	0.05	0.46	1.34
				$G = 0.620, p = 0.4310$		
Illness of grandchild						
No	235	57	24.3		1.0	
Yes	2	1	50.0	0.29	5.00	87.54
				$G = 1.119, p = 0.2900$		
Illness other						
No	230	58	25.2		1.0	
Yes	7	0	0.0	4.35 <sup>-15</sup>	0.00	21.01
				$G = 3.3704, p = 0.0543^+$		
Moving						
No	220	50	22.7		1.0	
Yes	20	8	40.0	0.91	2.37	6.18
				$G = 2.942, p = 0.0863^+$		
Moving of partner						
No	236	55	23.3		1.0	
Yes	4	3	75.0	0.91	8.93	88.93
				$G = 4.350, p = 0.3.92$		
Other live events						
No	218	50	22.9		1.0	
Yes	20	8	40.0	0.85	2.21	5.74
				$G = 2.528, p = 0.1119$		

NOTE: Same comments as Table 7

**Table 9** Average numbers of life events according to degree of threat. (*f* No. of live events; *N* sample size; *M* mean; *SD* standard deviation; *t* test for independent samples)

Degree of threat	Depression	f/N	M	SD	t	df	p
Minor	No	34/177	0.19	0.42	0.60	233	0.552
	Yes	9/ 58	0.16	0.37			
Little	No	54/177	0.31	0.58	-1.07	84.16	0.290
	Yes	24/ 58	0.41	0.70			
Moderate	No	33/177	0.19	0.46	-1.06	80.99	0.292
	Yes	16/ 58	0.28	0.59			
Strong	No	13/177	0.07	0.32	-2.58	71.98	0.012*
	Yes	15/ 58	0.26	0.52			

\*  $p \leq 0.05$

## Risk factors for depression

### Sociodemographic risk factors for depression

The relation between sociodemographic factors and the risk for depression was analysed by logistical regressions. We considered gender, age, living situation, family state, presence of children, the position in sisters, education, confession, social class and social income (Table 7). Relying on the odds ratio there was a significantly higher risk for the development of depression in persons living in institutions, and less risk in probands of primary position of sisters and of lower class. Other sociodemographic factors showed no relevant relation to the risk for depression.

*Life events and depression.* Probands were asked for certain life events the year preceding the examination. Analysis referring to the related life event and depression were reduced to persons without dementia according to the SIDAM SISCO score to improve the validity impaired by memory insufficiency. The originally examined total sample of 358 probands was therefore reduced to 241 subjects. Three aspects of life events in relation to depression were examined:

1. Do depressive probands suffer from certain specific life events?
2. Do the life events in depressives amount to a higher number in comparison with mentally healthy probands?
3. Are life events of depressive persons objectively more threatening?

Certain life events, such as widowhood, movement of husband or wife out of the common private household and changing living situation (moving of the interviewee), demonstrated a higher risk for development of depression (Table 8). Other life events, such as death of child, of friends or acquaintance, etc. did not increase the risk for depression. Depressive persons reported on average 1.1 life events in the past 12 months, and nondepressive persons reported a minor number of life events (0.8, n.s.). The depressives reported nearly four times more frequently life events of a higher degree of threat objectively measured by the physicians than the nondepressive persons (Table 9). There was nearly no difference or no significant difference in less threatening life events. Depressive persons have more but not significantly more life

**Table 10** Need for care, subjective well-being and risk for depression

	N	Depression		Odds ratio		
		n	%	Lower	95% CI	Upper
Need for care						
None	187	33	17.6		1.0	
≤ 2 weekly	32	11	34.4	1.10	2.50	5.71
> 2 weekly	134	43	32.1	1.41	2.42	4.13
				G = 40.3989, p = 0.000		
Subjective well-being						
Very well	196	25	12.8		1.0	
Moderate	101	35	34.7	3.44	3.65	6.67
Very bad	49	26	53.1	3.85	7.78	15.70
				G = 1.260, p = 0.2617		

NOTE: Same comments as Table 7

events, especially more threatening life events, and some specific life events.

### Need for care, subjective well being and depression

Evaluation of the need for care was a global medical judgement, being defined as basic care required – not already delivered – because of somatic illness, mental disorder or a combination of both categorised according to the time necessary for support, may be for medical aid or psychological or social support.

Need for care and the subjective estimation of health were identified as risk factors for depression. The degree of need for care as well as subjectively estimated health status showed a distinct connection to depressive disorders (Table 10). In persons dependent on need for care judged by the physicians the risk for depression doubled. With increasing health problems estimated by the probands themselves the risk for depression increased as well.

## Discussion

The distribution of patients undergoing psychiatric treatment does not enable conclusions to be drawn as far as the distribution of the mentally ill among the general population is concerned. Epidemiological studies of representa-

tive community samples are necessary to detect the true prevalence.

Different from many psychiatric epidemiological studies, interview and examination in our present study were conducted only by medical doctors trained in psychiatry. The rate of participation was high (89.1%). Nevertheless, the methodological dropout problem because of security reasons and refusal remains. Maybe those not investigated have more paranoid traits. Therefore, our results can only be considered as representative for the population assessed.

In our study the prevalence rates for depression according to different instruments were very similar, with the exception of the Hamilton score, a measurement of severity of depression. The GMS-AGECAT diagnosis of depression accorded well with the medical diagnosis according to DMS-III-R und ICD-10 ( $\kappa = 0.6$ ). Discrepancies were based on the fact of higher sensibility of GMS-A for depression. A milder degree of depressive symptoms in the GMS-A was already sufficient for the diagnosis of depression. Other epidemiological studies showed partly more and partly less agreement between GMS-A diagnosis and medical judgement (Copeland et al. 1975; Gurland et al. 1983). Every instrument proved different sensibilities and limitations, causing some methodological difficulties. Comparable prevalence rates were reported in the Iceland study (Magnusson 1989). We found no significant difference in depression according to gender, confirming results that these differences level off in high age (Jorm et al. 1987; Skog 1993; Copeland et al. 1987; Livingstone et al. 1990). Magnusson (1989) and Lindesay et al. (1989) demonstrated, however, higher rates for women. The younger age group (1901–1905 years of birth) in our study suffered significantly more often from depression according to DSM-III-R and ICD-10 diagnoses. Several epidemiological studies, such as the ECA study (Robins and Regier 1991), the Edmonton study (Bland et al. 1988) and the Canberra study (Henderson et al. 1993) showed also a decline of depression in old age. The question arises whether this is an artefact by loss of memory or the masking of depression by somatic symptoms or the consequence of higher mortality and the likelihood of institutionalisation of older depressives whereby most of these studies start for the older ones with the age 65 years and above. In our study we found a minor rate of major depression according to DSM-III-R in comparison with other epidemiological studies. Skoog et al. (1993) reported a prevalence rate for major depression in the same age groups of 7.7%, without considering criteria of duration of symptoms, Copeland et al. (1987) a rate of 4.2% and 3.9% of depressive psychoses in persons aged 85 years and older in Liverpool, England. Dysthymic disorders in our study corresponded well to the dysthymic disorders in Skoog's study with 4.5%. In our study the diagnosis of depressive neurosis was significantly higher in men, different to the results of Copeland (1987). In the Base study (Helmchen et al. 1996) the morbidity for all kind of depression according to DSM-III-R criteria amounted to 10%, and the subthreshold depression to 23% for persons aged 70 years and older. In the age group

85 years and older the depressive disorders were more often found.

Helmchen et al. (1996) declared a want of knowledge about the degree of impairment in daily life caused by mental disorders in old age. Oswald et al. (1996) demonstrated an improvement in everyday coping and hence in active strategies for staying independent by competence, memory and psychomotor training a task for the future.

Only 66% of the depressed persons reported suffering from illness. Maybe that depressive symptoms are not recognised as illness, accepted as age correlated. Depression influenced behaviour of contact, primary and secondary relations, the management of financial transactions and leisure time, all consequences leading to a loss of quality of life.

The most impairment was found in demented persons, confirming results of the Base study (Helmchen et al. 1996). As these results are partly based on self-ratings of the interviewees, answers may be influenced by mental illness and perhaps thus far reflect a depressive cognition.

In agreement with our results Horgan (1985), Schurman et al. (1985), Meller et al. (1986, 1989, 1996) demonstrated that the likelihood of receiving mental health care in the general medical factor increased directly with age, and conversely, the likelihood of using specialist services declined with increasing age. Elderly people were less likely to be referred to psychological services than younger people with a similar level of psychic distress (Lazarus and Weinberg 1980; Coulton and Frost 1982; German et al. 1985). Psychiatric facilities were rarely used by persons aged 85 years and older. Only 3.7% of all depressed subjects had received psychiatric treatment in the past 12 months. Psychosocial services were not consulted. Only 3.9% of all our probands and 9.5% of the depressives had a treatment by antidepressive medication. In Skoog's (1993) study conducted in Sweden 14% of all persons aged 85 years and older got an antidepressant agent. It may be that general practitioners are not aware of the depressive symptoms. It may also be that the general practitioners, playing the most important role in the treatment of the elderly, are of the opinion that specialists are not fond of and not dedicated to the treatment of the elderly. Widmer and Cadore (1978) demonstrated that physician visits and somatic complaints increased with the onset of depression, and Balint (1957) argued that the presentation of somatic complaints often masked an underlying emotional problem that was frequently the major reason for seeking advice. Nevertheless, somatic and psychological symptoms both increase in higher age (Turner and Beiser 1990; Blazer et al. 1991, 1992; Berkman et al. 1986). The association of chronic illness, disability in the sense of restrictions in daily activity and depression is well known (Turner and Noh 1988, Cooper and Sosna 1983). In a 1-year longitudinal study of an elderly New York sample Gurland (1988) found that  $t_1$ -disability doubled the rate of incident depression, but that  $t_1$ -depression tripled the rate of incident disability. Depression linearly increases with the number of illnesses and the degree of disability (Welz 1989; Lindesay 1989; Gurland 1988).



In the Iceland study by Magnusson (1989) no statistically relevant relation was found between depression and family state. Only in the group of the 87 aged women was prevalence for depression for single women (5.7%) reduced in comparison with married (11.7%), widowed (11.4%) and divorced (23.3%) women. Against our expectations, the depression rate was less in the lower social class, comparable to Magnusson's (1989) results.

Numerous changes in living situation, such as widowhood, somatic illness, need for care and institutionalisation, increased with higher age, whereas the total number of life events reported decreased. Some life events, such as death of spouse and illness, are more often perceived as natural in old age. By excluding persons diagnosed as demented, we tried to improve the validity of the results concerning life events and depression. In our study depressive probands had more life events, especially more threatening life events, which was comparable to the studies by Emmerson (1989) and Murphy (1982), considering that these studies included younger persons as well. Need for care and subjective well-being were additional risk factors for depression. In persons dependent on care, the risk for developing a depression increased. Kennedy et al. (1989) detected in an epidemiological study more depressives in persons dependent on care and impaired by illness. In a prospective study Kennedy et al. (1990) could demonstrate subjective non-well-being as a significant predictor for depression, in accordance with Harlow's (1991) results.

To be aware of risk factors for depression and to recognise depressive symptoms as treatable illness will be an important task in improving the quality of life of the aged in the future.

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