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Hospital admissions after transition into unemployment

Summary

Objective: It was examined whether the rate of hospital admissions change after transition into unemployment.
Methods: Data from a German statutory health insurance comprising 105554 individuals (70.9% men, 29.1% women) with documented employment periods were used. Unemployment periods were divided into three intervals: up to eight months, more than eight up to 16, and more than 16 up to 24 months.
Results: The overall "risks" of hospital admissions dropped after transition into unemployment. The relative risk (RR) in men and women for unemployment up to eight months was RR = 0.31 (95% CI: 0.28–0.34), for periods of more than eight up to 16 months it was RR = 0.35 (95% CI: 0.32–0.39) and for more than 16 up to 24 months it was RR = 0.27 (95% CI: 0.23–0.33). In contrast, for myocardial infarction they increased with length of unemployment: up to eight months: RR = 1.49 (95% CI: 1.04–2.13), more than eight up to 16 months: RR = 1.82 (95% CI: 1.21–2.74), more than 16 up to 24 months: RR = 3.08 (95% CI:1.84–5.17).
Conclusion: For myocardial infarction the findings may reflect increased morbidity, for occupational diseases they may reflect a decrease following ceasing expositions at the workplace. For the remaining diagnostic groups decreasing health care utilisation may apply without morbidity having changed.

Keywords: **Unemployment – Inpatient treatment – Health – Morbidity.**

Evidence for associations between unemployment and morbidity status has been published for a broad range of outcomes. In a panel study with young adults depression and anxiety were significantly elevated in unemployed individuals as compared to employed ones (Fergusson et al. 1997; Fergusson et al. 2001). In the National survey of families and households, unemployed subjects reported worse health conditions in terms of depressed mood and subjective health. These associations were valid only for white respondents but not for African Americans (Rodriguez 1994; Rodriguez et al. 1999). In another panel study with 8819 respondents, the impact of unemployment on depressed mood was replicated. Unemployed turned out to have the highest depression scores, employed subjects were ranking lowest, and subjects with inadequate, i.e., low income jobs were located in between (Dooley et al. 2000).

Effects of factory closings on health were examined in a study with 1597 men and women working in the car industry (Hamilton et al. 1990). In four plants dismissals had been planned, in 12 the workplaces had been considered as secure. Assessments took place three months before the closures and a second inquiry was conducted after the shutdown. In the anticipatory phase effects on health emerged, but they were strongly dependent on demographic and contextual characteristics. After transition into unemployment symptoms of depression, anxiety as well as somatic complaints were elevated.

In another study with a two-year follow-up, cross-sectional associations between unemployment and subjective health as well as somatic diseases, psychiatric and personality disorders were reported. Again, subjective health, personality and psychiatric disorders turned out to be worse in unemployed than in employed (Clausen et al. 1993). Data from the Whitehall II study with 666 male and female subjects also permitted inquiries into the effects of unemployment on health. Health assessments comprised minor psychiatric morbidity, subjective health, longstanding illness and outpatient consultations, but the length of unemployment periods had not been reported. Both minor psychiatric impairments and the number of outpatient consultations were elevated in subjects with unemployment and insecure re-employment as compared to individuals with secure jobs (Ferrie et al. 2002; Martikainen 1990; Ferrie et al. 2001). Examinations with data from the British Household Panel Survey did not pro-

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duce the same results, although also the General Health Questionnaire had been used for assessing impaired health. Unemployment was found to be unrelated with mental disorders, but once being off the job and in bad health, unemployment contributed to the maintenance of mental disorders, especially in terms of depression and anxiety (Weich & Lewis 1998).

In a Finnish cohort study with 586 men (Liira & Leino-Arjas 1999; Leino-Arjas et al. 1999) besides measures of distress symptoms of musculoskeletal disorders were assessed. In this inquiry no associations between specific diseases and length of unemployment were reported.

In a study on health-related effects of dismissals, incidences of joint swellings and dyspepsia in unemployed males were reported (Kasl et al. 1975). In the case of arthritis, the effects of unemployment were moderated by the amount of social support these 100 men received (Cobb 1976). Assessments took place before being laid off and up to 24 months later. In another factory-closing study hospital admissions were used as criterion (Iversen & Sabroe 1989), and again only men had been considered. The group of unemployed comprised 887 men, 441 were in the control group, and five years before and three years after shipyard closure had been covered. Taken as a whole, in unemployed the number of all hospital admissions dropped from 85/1000 observation years to 74.5, but in the control group it rose from 56.2/1000 to 96.5, finally resulting in a lower relative risk (RR) of RR = 0.74 for unemployed subjects. Breaking these figures down into diagnostic groups, the number of diseases of the circulatory system (ICD 400–458) in both groups increased, and was thus more pronounced in unemployed. However, the differences between unemployed and controls were not significant since the case numbers were too small. For diseases of the digestive system, an increase in hospital admissions occurred only in controls. Finally, hospital admissions of the musculoskeletal system (ICD 710–738) increased in both groups, but the relative risk of RR = 1.25 for unemployed as compared to employed was not significant. Again the numbers of hospital admissions had been too small for obtaining stable parameter estimates. Compared to the general result of lower risks for inpatient treatment in unemployed, findings for musculoskeletal and cardiovascular diagnoses were deviating from the general result. The authors noted that accidents strongly accounted for the observed decreases of hospital admissions, but they could not completely resolve this puzzle. The frequencies in the single diagnostic categories were low in spite of a considerable sample size. A recent study with a narrower diagnostic focus adds to this information. It was found that in unemployed the inpatient treatment due to lumbar intervertebral disc disorders dropped with increasing length of unemployment (Leino-Arjas et al. 2002).

In the following analyses we will take up the considerations on the aforementioned studies by considering hospital admissions as health outcomes following unemployment. We will use data from a German statutory health insurance that has the advantage of large case numbers. We expected to avoid unstable parameter estimates that were a major problem in the study by Iversen and Sabroe (1989). In contrast to a number of earlier studies, analyses can also be performed separately for men and women. Furthermore, health insurance records contain both information on employment/unemployment and on inpatient treatment with the dates of beginning and end. The non-reactive process-oriented character of health insurance records make them unsusceptible to response effects that may occur in survey data relying on respondent-based information.

Based on the literature review above, the following research questions will be dealt with:

1) Are the risks of hospital admissions in unemployed higher or lower than in employed individuals?
2) Are the risks for specific diagnostic groups different from the results on admissions due to all causes?
3) Do the results obtained in response to questions one and two differ between men and women?

The literature on social inequality in health has consistently shown that morbidity shows a strong social gradient to the detriment of individuals holding lower socio-economic positions (Mielck 2000; Leclerc et al. 2000; Stronks et al. 1998; Mackenbach et al. 1997; Geyer & Peter 2000; Peter & Geyer 1999). Thus we will also have to take socio-economic position into account.

Methods

Data and study population

The results of the following analyses are based on anonymised data (recorded between 1987 and 1996) of a German statutory health insurance, the Allgemeine Ortskrankenkasse (AOK) Mettmann. It is a statutory health insurance that does not cover the upper 10% of the population. However, among statutory health insurances the AOK insurances do not represent all social groups how they are distributed in the German population. Manual positions are over-represented while the proportions of executives and intermediate positions are smaller than in the general population (Abel & Wysong 1991). In an earlier work with the same database this issue has been addressed and the distributions

in our insurance population have been compared with the German population (Geyer & Peter 1999).

The population under study was either currently working in the production industry or in the service sector, and subjects were employed until their insurance periods exceeded the age interval considered here (i.e., 60 years), until they joined another health insurance due to a job change and/or a change of residence. We included only individuals with insurance periods of at least one year, and the analyses are restricted to individuals between 25 and 60 years of age. If parts of the insurance period were above or below this interval, the individual observation periods and all related events were truncated ("censorised"). The upper age limit of 60 years was chosen in order to exclude individuals who, instead of becoming unemployed, may experience early retirement. Given these selection criteria, we arrived at 136 632 subjects. After omitting individuals for whom no employment information was documented, the records of 105 554 individuals were available with 70.9% (n = 78 830) being men and 29.1% (n = 30 724) being women (Tab. 1). 13 891 of them experienced unemployment of at least two months. Dividing unemployment periods into intervals, 8 848 (63.7% of all unemployed) had periods of less than eight months, 4 111 (25.6%) experienced joblessness between eight to 16 months, and 932 (6.7%) had periods of more than 16 up to 24 months.

As already mentioned, a considerable proportion of our insurance population could not be classified with respect to socio-economic status, and by this reason they were omitted. The composition of these unclassified insured is heterogeneous. They are made up of single mothers, welfare recipients, long-term unemployed and finally of individuals with employment where classification information had not been transferred from employers to the health insurance. The share of each of these subgroups cannot be given exactly, and in our statistical analyses this will cause considerable uncertainty.

Unemployment episodes were reported with the dates of beginning and the date of end. The health insurance keeps this information since income is the basis for calculating the individual insurance fees. Since the literature did not give information on how to classify unemployment periods (maximal 24 months) into intervals, we decided to divide them into thirds, i.e., up to eight months/more than eight up to 16 months, and more than 16 and up to 24 months.

Jobless intervals lasting less than two months were not counted as previous studies have shown that in the beginning of an unemployment period affected individuals may hope to getting another job within a short period of time (Frese 1987). Stressful consequences and depression may emerge only after longer jobless periods. We also excluded cases with unemployment lasting for more than two years. According to the German regulations, the health care of individuals with unemployment exceeding two years usually is paid by the social welfare, and subsequently only a minority of them is registered in a health insurance. Thus, considering individuals with unemployment of more than two years would result in a loss of cases of unknown extent that in turn might cause selection biases.

Hospital admissions were also recorded with beginning and end dates. They were transmitted from the hospitals to the health insurance for accounting purposes. Periods of less than two days were not counted in order to exclude patients coming in only for diagnostics. In the following analyses we have considered only inpatient periods overlapping completely with unemployment: If unemployment of up to eight months were considered, we counted hospital admissions occurring within this period, if unemployment periods of more than eight months up to 16 were considered, we counted the months up to 16 months of unemployment, etc.

Hospital diagnoses were coded according to ICD-9 as transmitted from the hospitals to the health insurance along with information on admissions and discharges. The diagnoses were grouped into broader categories according to ICD-9:

Table 1 Distributions for gender, employment status and socio-economic position of the study population

	Unemployment		Socio-economic status				
	Yes	No	Intermediates/ Professionals	Skilled non-man.	Skilled manual	Unskilled/ semiskilled	Total
Men	9312 (12.4%)	65 518 (87.6%)	6518 (8.7%)	14 194 (19.0%)	22 446 (30.0%)	31 672 (42.3%)	78 830 (70.9%)
Women	4579 (14.9%)	26 145 (85.1%)	127% (4.2%)	8019 (26.1%)	2216 (7.2%)	19 212 (62.5%)	30 724 (29.1%)
Total	13 891 (13.16%)	91 663 (86.4%)	7795 (7.4%)	22 213 (21.0%)	24 662 (23.4%)	50 884 (48.2%)	105 554 (100%)

infectious diseases (ICD 110–139), malignancies (140–208), benign tumours (210–229), in situ carcinoma (230–234), neoplasms of unknown origin and development (235–239), metabolic diseases (240–279), blood-related diseases (280–289), organic psychoses (290–299), neuroses and personality disorders (300–316), diseases of the nervous system (320–389), diseases of the circulatory system (390–405/411–459), myocardial infarction (410), diseases of the respiratory organs (460–519), diseases of the digestive organs (520–579), diseases of the genitals and urological diagnoses (580–629), pregnancy complications (630–679), skin diseases and diseases of the subcutaneous tissue (680–709), musculoskeletal diseases (710–739), general symptoms (780–799), unspecific symptoms (780–799), injuries and intoxications (800–999). In the results section the results for the most frequent diagnostic groups are presented.

Occupational group membership was determined using an official three-digit classification issued by the German Labour Authority (Bundesanstalt für Arbeit 1992). When combining occupations to groups, their qualification levels as published by the Institute of Labour Market and Occupation Research was also taken into account (Parmentier et al. 1996). According to the British Registrar General classification, the categories were collapsed into five groups: "unskilled and semi-skilled positions", "skilled manuals", "skilled non-manuals", "intermediates" and "professionals". Due to the small number of professionals, "intermediates" and "professionals" were counted together. In case of changes in socio-economic position within the observation period the highest one was assigned.

Statistical procedures

The following results are based on Cox' proportional hazards model (Cox & Oakes 1984; Collett 1994). Cox regression is appropriate here since it depicts a time process whereas it is assumed that certain events (in the present case hospital admissions) will occur as a function of time having elapsed. If covariates are introduced (in the present case unemployment, indicators of socio-economic status and gender) for every covariate it will be estimated to what extent the time process in question is altered, in the present case whether the respective risks of a hospital admission for defined groups decrease or increase. The dependent variable is risk of a hospital admission at a given point of age within a defined age range, here: between the age of 25 and 60. Occupational position was introduced as a control variable for taking socio-economic differences in help-seeking behaviour into account (Van der Meer 1998). As this type of socio-economic differences is presently not our main interest, we will not give the results for each category but a summary measure expressing the mean effect. The combined group of intermediates and professionals, i.e., the highest category, will be used as reference category.

The computed regression scores and the respective confidence intervals can be transformed mathematically into hazard ratios, interpretable as age-standardised relative risks. Thus, a hazard ratio above 1 indicates that in the presence of a given covariate the *hr* for a given event and for a given time period increases. If the covariate is categorical, as is socio-economic status and gender, the relative risk is estimated for a given category as compared to a reference category. The relative risks are standardised for the time interval considered. In unemployed this refers to the length of the three unemployment periods, for employed subjects it refers to the time they were insured.

The descriptive statistics were performed with SPSS 6.1 (Norusis 1993), and STATA 6 was used for performing the Cox-regressions (Stata Corp. 1999).

Results

The frequencies of the diagnostic groups for employed and unemployed subjects are displayed in Table 2.

Now the regression analyses are presented. At first the results for all admissions irrespective of diagnosis are described; for specific diagnostic groups only the most frequent ones are displayed in the following tables.

Table 2 Frequencies of diagnoses in women and men for the most frequent diagnoses

Disease groups (ICD9-code)	Men (n = 78830)	Women (n = 30724)	All (N = 105554)
All diagnoses	16095 (21.5 %)	10274 (33.4 %)	26369
Myocardial infarction (ICD9: 410)	388 (0.5 %)	72 (0.2 %)	460
Neuroses, personality disorders (ICD9: 300–316)	799 (1.1 %)	453 (1.5 %)	1252
Disorders of digestive organs (ICD9: 520–579)	2526 (3.4 %)	912 (3.0 %)	3438
Musculoskeletal disorders (ICD9: 710–729)	3680 (4.9 %)	2047 (6.7 %)	5727
Injuries/intoxications (ICD9: 800–999)	705 (0.9 %)	283 (0.9 %)	988
Disorders of respiratory organs (ICD9: 470–478)	1682 (2.3 %)	569 (1.9 %)	2251

Table 3 Age-standardised relative risks of being admitted to hospital due to all diagnoses

	All diagnoses					
	Men		Women		Women and men	
	RR	95 % CI	RR	95 % CI	RR	95% CI
Employed*	1	–	1	1	1	—
Unemployment up to 8 months	0.28	0.25–0.32	0.35	0.31–0.40	0.31	0.28–0.34
Unemployment >8–16 months	0.29	0.25–0.32	0.44	0.38–0.52	0.35	0.32–0.39
Unemployment >16–24 months*	0.28	0.22–0.37	0.28	0.21–0.36	0.28	0.23–0.33
Occupational position**	1.56	1.52–1.59	1.15	1.13–1.18	1.37	1.35–1.39
Gender (women)***	–	–	–	–	1.34	1.30–1.37

* Reference category (risk=1); ** Reference category: intermediate occupations/professionals; ***Reference category: men.

Table 4 Age-standardised relative risks of being admitted to hospital for specific diagnoses

	Men		Women		Women and men	
	RR	95% CI	RR	95% CI	RR	95% CI
Myocardial infarction (ICD9: 410)						
Employed*	1	–	1	1	1	–
Unemployment up to 8 months	1.42	0.96–2.11	1.99	0.85–4.65	1.49	1.04–2.13
Unemployment >8–16 months	1.79	1.15–2.80	2.05	0.74–5.69	1.82	1.21–2.74
Unemployment >16–24 months*	2.94	1.61–5.37	3.53	1.28–9.75	3.08	1.84–5.17
Occupational position**	1.23	1.09–1.41	1.57	1.11–2.23	1.28	1.13–1.44
Gender (women)***	–	–	–	–	0.37	0.29–0.48
Neuroses and personality disorders (ICD9: 300–316)						
Employed*	1	–	1	1	1	–
Unemployment up to 8 months	1.05	0.77–1.42	0.64	0.38–1.10	0.92	0.71–1.17
Unemployment >8–16 months	0.86	0.56–1.34	0.50	0.24–1.05	0.73	0.51–1.06
Unemployment >16–24 months*	0.38	0.12–1.18	0.26	0.06–1.05	0.32	0.13–0.77
Occupational position**	1.44	1.31–1.58	1.17	1.05–1.31	1.32	1.23–1.43
Gender (women)***	–	–	–	–	1.15	1.02–1.29
Diseases of digestive organs (ICD9: 520–579)						
Employed*	1	–	1	1	1	–
Unemployment up to 8 months	0.28	0.21–0.37	0.34	0.21–0.55	0.30	0.23–0.38
Unemployment >8–16 months	0.24	0.16–0.37	0.27	0.14–0.53	0.25	0.18–0.36
Unemployment >16–24 months*	0.18	0.08–0.44	0.50	0.25–0.99	0.30	0.17–0.51
Occupational position**	1.67	1.58–1.76	1.22	1.13–1.32	1.52	1.45–1.59
Gender (women)***	–	–	–	–	0.71	0.66–0.77
Musculoskeletal disorders (ICD9: 710–729)						
Employed*	1	–	1	–	1	–
Unemployment up to 8 months	0.17	0.12–0.24	0.29	0.20–0.43	0.21	0.16–0.27
Unemployment >8–16 months	0.20	0.13–0.30	0.32	0.20–0.50	0.24	0.18–0.32
Unemployment >16–24 months*	0.23	0.12–0.44	0.26	0.13–0.49	0.24	0.15–0.38
Occupational position**	1.44	1.38–1.51	1.32	1.25–1.40	1.40	1.35–1.45
Gender (women)***	–	–	–	–	1.10	1.04–1.16
Injuries and intoxications (ICD9: 800–999)						
Employed*	1	–	1	–	1	–
Unemployment up to 8 months	0.012	0.05–0.026	0.18	0.05–0.55	0.13	0.07–0.26
Unemployment >8–16 months	0.03 §	0.003–0.19 §	0.28	0.09–0.87	0.10	0.04–0.27
Unemployment >16–24 months*			0.19	0.03–1.36	0.07	0.01–0.51
Occupational position**	1.68	1.51–1.86	1.06	0.93–1.20	1.44	1.33–1.56
Gender (women)***	–	–	–	–	0.82	0.71–0.94
Diseases of the respiratory organs (ICD9: 460–519)						
Employed*	1	–	1	–	1	–
Unemployment up to 8 months	0.15	0.09–0.24	0.51	0.31–0.84	0.22	0.16–0.32
Unemployment >8–16 months	0.33	0.22–0.51	0.76	0.45–1.27	0.43	0.31–0.60
Unemployment >16–24 months*	0.16	0.05–0.50	0.20	0.05–0.82	0.17	0.07–0.41
Occupational position**	1.74	1.62–1.86	1.07	0.98–1.18	1.50	1.42–1.59
Gender (women)***	–	–	–	–	0.67	0.61–0.74

* Reference category (risk=1); ** Reference category: intermediate occupations/professionals; ***Reference category: men.

Looking at *all hospital admissions* it turns out that admission risks drop considerably after transition into unemployment (Tab. 3). Once off the job, the differences between unemployment periods are not pronounced and substantially negligible. This holds for men as well as for women.

Now the admission rates are broken down and analysed for diagnostic categories in order to find out which ones are different from the overall finding of decreasing admission risks. Only the results for the most frequent diagnostic groups are tabulated below (Tab. 4).

Myocardial infarction is the first case deviating from the general pattern in Table 3. Admission risks show a steady increase with the length of unemployment, thus reaching up to threefold risks for the longest jobless period considered (RR = 3.08). This result holds both for women and men, whereas in females the increases in admission risks are more pronounced (RR = 3.53) than in males (RR = 2.94).

Neuroses and personality disorders show a different pattern. If women and men are counted together, the admissions in employed and unemployed in the first two periods do not differ. The third one then shows a considerable drop. This latter finding can be reproduced separately for women and men, but the confidence intervals are too wide, thus one should refrain from drawing substantial conclusions. The lack of statistical significance should be attributable to small numbers of admissions in the group of long-term unemployed.

For the remaining diagnostic groups considered, i.e., *diseases of digestive organs, musculoskeletal disorders, injuries/intoxications,* and *diseases of the respiratory organs*, the general pattern of decreasing admission risks among unemployed is reproduced. For injuries and intoxications again small numbers in the two highest unemployment periods in men appear thus making it necessary to count them together.

Socio-economic differences to the detriment of individuals holding lower positions are obtained for all diagnostic categories. Throughout the social gradients in women are smaller than in men. Since the research questions formulated in the introduction were not directed towards examining social differences in hospital admissions, only summary estimates over all categories are presented. As we have classified our subjects into four groups of socio-economic positions, a relative risk of 1.37 (see the analysis for all hospital admissions in Tab. 3) has to be interpreted that, setting the risk of a reference group to 1, the RR increases of 1.37 per category of occupational group position. Thus, the risk in the lowest occupational group (unskilled occupations) is RR = 4.11.

Gender differences emerged in the analysis on all-cause admissions as well as for specific diagnostic groups. Taking all admissions into account, women had higher risks for being admitted than men. If single categories are considered, this holds for musculoskeletal disorders and psychiatric diagnoses. For diseases of digestive and respiratory organs and for accidents/intoxications the risks are more pronounced in men. As it could be expected (Koskinen & Martelin 1994), the same result emerges for myocardial infarction.

Discussion

In this paper differences in hospital admissions between employed and unemployed men and women have been examined. The bulk of the available literature suggested that admission rates in unemployed might be higher than in employed. In our data hospital admissions were occurring more frequently in employed than in jobless individuals. This result seems to contradict earlier findings on the size of relationships between unemployment and health, but a closer look reveals that in earlier studies hospital admissions had not often been subject to scientific consideration. In a recent study (Leino-Arjas et al. 2002) lumbar intervertebral disc disorders were considered and similar results than in our study emerged. In a shipyard closing study Iversen and Sabroe (1989) examined a broad range of hospital diagnoses as health-related outcomes, and their results also show similarities to ours, although some analyses were affected with estimation problems due to low cell frequencies. In the last one of two follow-up assessments, the overall relative risks were lower in the study group of unemployed workers than in controls. Due to small frequencies, information on diseases of the circulatory, digestive and musculoskeletal systems the differences could not be interpreted. The category with the largest differences were accidents and other external causes (ICD 9: 800–999). In shipyard workers that kept their jobs, hospital admissions increased while in the unemployed they dropped, thus resulting in lower relative risks for unemployed. Lower risks for dismissed individuals have also been found in our study, so we have confirmed these earlier results. The authors attributed the increase of accidents to dangerous working conditions in the shipbuilding industry. From the perspective of our findings it can be concluded that this might also apply to our health insurance population, but the spectrum of occupations was quite heterogeneous. There was a mixture of different sorts of the "traditional" production industries and the service sector (Geyer & Peter 1999).

It has to be explained what is being expressed with the findings of our study and what our data have depicted. Changes in morbidity should be reflected only to a limited extent since the data are records of hospital admissions. We expect

two independent processes to account for the results: changes in morbidity and levels of activity differing between employed and unemployed. In Germany the status of unemployment does not imply restrictions in health coverage, although unemployment-associated shortages in money may motivate changes in help-seeking behaviour. The sharpest drop in income occurs only after two years off the job, then unemployment benefits terminate and only public assistance is available, but periods off the job exceeding two years had not been considered in our analyses.

For the case of myocardial infarction higher rates of inpatient treatment should reflect increased levels of morbidity. The precise relationship with hospital admissions cannot be quantified since a certain proportion of myocardial infarctions lead to death without being admitted to hospital. However, those who do not die immediately are referred to inpatient treatment and receive intensive care. The number of untreated individuals should be negligibly small.

For musculoskeletal disorders there is reason to assume that our results also point to decreased morbidity in unemployed since this category relates to occupational diseases. In jobless individuals the exposition to provoking environmental agents may be reduced, although long-term effects of earlier employment have to be allowed for.

Health care utilisation in unemployed may also be altered directly via decreased levels of activity that again is influenced by lowered self-esteem (Bartley 1994; Kieselbach 1990). Unemployment studies suggest that psychiatric disorders may increase since elevated rates of depressed mood have repeatedly been documented (Weich & Lewis 1998; Rodriguez 1994; Rodriguez et al. 1999; Dooley et al. 2000), and for the more severe cases it should result in increased risks of being admitted to impatient treatment. This may be counterbalanced by reduced activity levels thus contributing to the high proportion of untreated depressives in the population (Fichter 1990).

In our jobless insurance population we have considered inpatient treatment within unemployment periods. This is based on the assumption that only changes in health within these periods may be due to job loss. For myocardial infarction such an assumption may not necessarily be appropriate, since we have to allow for a time lag between the occurrence of a stressor and disease onset. Studies on effects of stressful life events have demonstrated disease-specific variations of latency periods between the occurrence of an event and deterioration in health. For major depression one to nine weeks have been reported (Brown & Harris 1978; Brown & Moran 1994), for anxiety disorders this may last up to three months (Finlay-Jones 1989). For myocardial infarction the respective figures were three months (Siegrist & Dittmann 1981), but in this case effects of stressful events have to be interpreted against the backdrop of cumulative strains implying that also longer periods should be considered. There is evidence that the distress-related effects of unemployment develop gradually, and there may be a plateau within the period of 18 to 27 months after having lost the job (Bartley 1994). For malignant diseases the case is even more complicated. Cancers may undergo much longer periods between initiation, manifestation and subsequent hospitalisation. Thus it may be justified to extend the analyses to observation periods beyond the end of unemployment. With our data, such analyses have been performed for a period of three months after the end of the first unemployment and another line without a defined time limit. The results of these additional analyses and those presented in Tables 3 and 4 do not differ considerably. In the research literature it has been reported that overall mental health impairments of unemployment may improve after having found a job (Banks & Jackson 1982; Tiggeman & Winefield 1984), but there is also evidence on the longevity of health-related effects (Wadsworth et al. 1999) of unemployment. Our analyses on effects after re-entry into the job have however to be considered as crude, since the length of these "vulnerable" periods have do be determined for each disease category separately, and the knowledge permitting to fix them is not sufficiently developed.

Our study rests on health insurance data, and there is reason to assume that the records of inpatient treatment are complete. As the material is non-reactive, our conclusions are not impaired by problems of non-response. Finally, we could perform our analyses for men and women and occupational position could be controlled for.

The results can be generalised within the limits described in the method section. We do not have information on the upper 10% of the income population, and we cannot say very much about individuals holding intermediate and executive positions. However, related to our insurance population the results are descriptive and valid since we have included all subjects who were members of this insurance between 1987 and 1996.

Some further disadvantages of our data have to be acknowledged: Neither "true" morbidity nor outpatient treatment had been recorded. We also do not have information on factors mediating between unemployment, morbidity and hospital admission. Former studies identified a number of such influences like social support (Cobb 1976), locus of control (Linn et al. 1985), depressed mood and age (Rodriguez et al. 1999; Dooley et al. 2000), suggesting that the relationships between unemployment and health care utilisation are more complex than we could describe them. The results neverthe-

less permit to look at another facet of the complex relationships between unemployment and health.

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Zusammenfassung

Krankenhausaufnahmen nach dem Übergang in die Arbeitslosigkeit

Fragestellung: Es wird untersucht, ob sich die "Risiken" für Krankenhausaufnahmen nach dem Übergang in die Arbeitslosigkeit verändern.

Methode: Grundlage waren Daten einer deutschen gesetzlichen Krankenkasse; der verwendete Bestand umfasste 105 554 Personen (70,9 % Männer, 29,1 % Frauen) mit dokumentierten Beschäftigungsperioden. Arbeitslosigkeitsperioden wurden in drei Intervalle geteilt: bis zu acht Monate, mehr als acht bis zu 16 Monate und mehr als 16 bis 24 Monate.

Ergebnisse: Risiken für Krankenhausaufenthalte über alle Diagnosen fielen nach dem Übergang in die Arbeitslosigkeit ab. Das relative Risiko (RR) für Männer und Frauen mit Arbeitslosigkeit bis zu acht Monaten betrug RR = 0,31 (95 % CI: 0,28–0,34), für mehr als acht bis 16 Monate: RR = 0,35 (95 % CI: 0,32–0,39), und für mehr als 16 bis zu 24 Monaten: RR = 0.27 (95 % CI: 0,23–0,33). Aufnahmerisiken wegen Herzinfarkt stiegen jedoch mit der Dauer der Arbeitslosigkeit: RR = 1,49 (95 % CI: 1,04–2,13) für Perioden bis acht Monate, RR = 1,82 (95 % CI: 1,21–1,74) für mehr als acht bis 16 Monate, and RR = 3,08 (95 % CI:1,84–5,17) für mehr als 16 bis zu 24 Monate.

Schlussfolgerungen: Für Herzinfarkt kann auf erhöhte Morbidität bei Arbeitslosen geschlossen werden. Für berufsbedingte Erkrankungen sollte sich in den Ergebnissen eine verringerte Exposition niederschlagen. In allen anderen Diagnosegruppen sollte eine verringerte Inanspruchnahme stattgefunden haben, ohne dass sich der Morbiditätsstatus verändert haben muss.

Résumé

Hospitalisations suite à la transition au chômage

Objectifs: Analyser le changement du risque d'hospitalisation suite à la mise au chômage.

Méthodes: Analyses menées à partir des données d'une caisse-maladie allemande comportant 105 445 individus dont 70,9 % d'hommes et 29,1 % femmes avec des périodes d'emploi documentées entre 1987 et 1996. Les diagnostics étaient classifiés selon ICD-9. Les périodes de chômage étaient divisées en trois catégories: (1) ≤ 8 mois, (2) > 8 mois à ≤ 16 mois et (3) >16 mois à ≤ à 24 mois.

Résultats: Le risques d'hospitalisation diminuaient après la mise au chômage. Comparé aux employés, le risque relatif de chômage était RR = 0,31 (IC = 0,28–0,34) pour la première période, de RR = 0,35 (IC = 0,32–0,39) pour la deuxième, et de RR = 0,27 (IC = 0,23–0,33) pour la troisième période. Les deux exceptions étaient: Le risque d'hospitalisation à cause d'un infarctus du myocarde augmentait avec la durée du chômage: RR = 1,49 (IC = 1,04–2,13) pour la première période, RR = 1,82 (IC = 1,21–2,74) pour la deuxième et RR = 3,08 (IC = 1,84–5,17) pour la troisième. Pour les maladies psychiatriques, il n'y avait pas des différences pour jusqu'à 16 mois de chômage, après cela (>16–24 mois) le risque relatif pour les chômeurs diminuait.

Conclusions: Ces résultats peuvent s'expliquer de trois façons. Les chômeurs subissent une mortalité élevée par infarctus du myocarde. Pour les maladies professionnelles, la cessation de l'exposition s'accompagne d'une réduction du risque. Pour tous les autres catégories des diagnostics, il peut y avoir eu un modification de l'utilisation des services médicaux sans nécessairement un changement du risque.

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