Socioeconomic Stress and Drug Consumption: Unemployment as an Adverse Health Factor in Croatia

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Aim To explore to what degree unemployment was related to health problems expressed in terms of consumption of prescription drugs in Croatian citizens.

Methods Based on the Croatian Institute for Health Insurance data for 2003, the number of prescriptions per insured individual (NPI) was calculated for employed and unemployed persons, as well as for different subsets according to the region (Zagreb, Split, Rijeka, Osijek), age, gender, and prescribed drug category.

Results During 2003, a total of 1 003 547 drugs were prescribed to 949 746 health-insured persons aged 18-69 years. NPI was 32% higher for unemployed than for employed citizens; it averaged 0.995 among the employed, and 1.317 among the unemployed. Differences in NPI (ΔNPI) between the employed and the unemployed varied within the subsets; the largest difference was observed in the Zagreb region (ΔNPI = 0.522), in the 30-39 age group (ΔNPI = 0.563), in men (ΔNPI = 0.565), and for anxiolytic/antidepressant drugs (ΔNPI = 0.184).

Conclusion Our findings indicate that unemployed Croatian citizens used more drugs, which calls for the implementation of health care measures to reduce or prevent their medical problems, particularly those affecting mental health. Medical problems associated with unemployment present a specific burden for family medicine and the health care system.

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There are many factors which influence population health, such as physical environment, social surroundings including lifestyle, genetics, and health care. Thus, even the provision of the best possible health care will not necessarily ensure optimum levels of health in a community. Sick individuals present to physicians with complicated ailments, which is why a clear distinction between disease (deranged bodily structure/function) and illness (perception of unhealthy condition) should be made. Most diseased people are also ill, but some have a disease and are not ill (eg, undiagnosed diabetes or hypertension) or do not wish to be ill (eg, disabled persons, dissimulation). There are also people who feel ill but in whom no causal disease can be found to explain their ailments (eg, medically unexplained physical symptoms or anxiety). A large portion of all people attending general medicine offices have medically unexplained physical symptoms as reactions to various forms of external strain (eg, unemployment or divorce), which may occur as an alternative to constructive adaptive behavior or as an unproductive substitute for effective coping.

Studies of unemployed people have practical significance for health and social professionals, as well as for governmental and nongovernmental organizations that create and carry out programs in domains of health economics, medical services, and social care. The unemployment rate in Croatia is one of the highest both in Europe and among the transitional countries (1,2). According to the Central Statistics Bureau data, it amounted at 19.2% in 2003 (3) and currently is estimated at 18.7%, compared with the European Union average of 8.8% (4). Unemployment rates are not equally geographically distributed, ranging from 35.3% in Vukovar-Srijem County to 8.0% in Istria County (5). Among the main Croatian cities, the unemployment rate was highest in the Osijek area (27.5%), followed by Split (24.7%), Rijeka (14.3%), and Zagreb (8.2%) area (5). Although this is a social, economic, and medical problem of major public interest, it has rarely been addressed from the medical standpoint (6-8).

Data from other countries report more health difficulties among the unemployed in regions with lower unemployment rate (9,10), among unemployed middle-aged persons (7), or among unemployed men compared with women (11-13), suggesting that the employment status and psychophysical health stand in a mutual cause-and-effect relationship (14-17). Some studies focused on stress which people experience when they lose their job and which lasts, with more or less intensity, during the whole job-searching period (6). Most authors agree that job loss and involuntary unemployment represent some of the most stressful events (18-21). They also concur that the state of stress indirectly or directly disrupts mental and physical health as a consequence of weakened immunity, excessive tranquilizer and other drug consumption, reduced sleep, and/or altered appetite (7). It is possible that, because of financial problems, deranged psychophysical activity, helplessness, loss of motivation, or preoccupation with searching and waiting for a job, an unemployed person is paying less attention to healthy life style and other preventive activities (7).

The aim of this study was to investigate how unemployment among Croatian citizens is related to their health problems, using the amount and quality of drug consumption as an indicator of primary health care utilization (almost all the prescriptions in Croatia are issued by the family physicians). It was presumed that, because of the mentioned mechanisms, drug consumption was higher among the unemployed individuals.

Methods

The number of yearly prescriptions per insured individual (NPI) was assessed among unemployed and employed persons, and the relative differences between these two groups were analyzed for four major regions in Croatia.

The studied sample consisted of 949 746 Croatian citizens aged 18-69 years (Table 1). The data were also available for a small subset of employed/unemployed persons aged 70-79 years; this small segment (5060 out of 954 806 or 0.53% of all employable persons aged 18-79 years) was excluded from the statistical analysis (Tables 2-4) to avoid data skewness but included in graphical presentation of the whole sample (Figure 1).

Since the overwhelming majority of Croatian citizens have basic health insurance (4 303 087 insured inhabitants or 95.7% of the total population of 4 494 749), which covers family medicine consultations and drug prescriptions, the sample was representative of the respective segment of the Croatian population (3).

The data about drugs prescribed and refunded to employed or unemployed health-insured citizens, aged 18-69 years, for the period from January 1 to December 31, 2003 were obtained from the files of the Croatian Institute for Health Insurance in Zagreb, with their permission. The prescription prevalence of the leading 102 drug groups according to Anatomical Therapeutic Chemical (ATC) drug classification (22) was calculated, with a special emphasis on psychotropic (anxiolytics and antidepressants, groups N05B, N06), antidiabetic (ATC group A10), antihypertensive (ATC groups C03, C07-
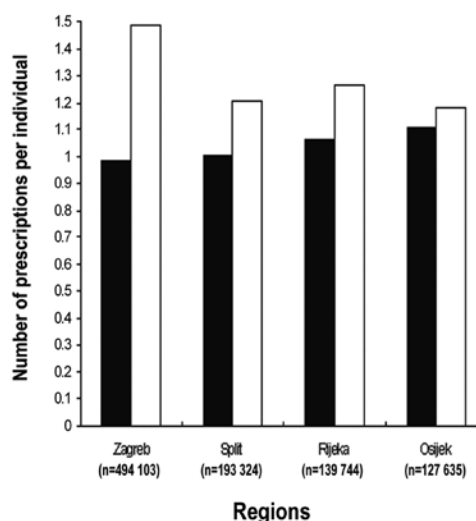

Figure 1. Average individual number of prescriptions per region and per year (NPI) in 2003, for employed (closed bars) and unemployed (open bars) insured persons. The graph includes 5060 persons in the 70-79 age group, so that the total number of examinees is higher (954 806 instead of 949 746 individuals) in the figure than in the tables.

C09), and respiratory drugs (ATC groups R03, R05). Patient subsets were defined according to the employment status, residence in one of the four main Croatian regions (Zagreb, Split, Rijeka, Osijek), gender, and age.

As the available data did not include the number of prescriptions per each person, standard deviations were not computable. Therefore, mean number of prescriptions per individual (NPI) for each subgroup was calculated by dividing the number of prescriptions by the number

Table 1. Employment status according to age, gender, and residence in four Croatian regions

Employment status	Age (years)	No. (%) of participants*							
		Zagreb		Split		Rijeka		Osijek	
		men	women	men	women	men	women	men	women
Employed	18-29	40 849 (5.3)	38 941 (5.1)	14 086 (1.8)	12 843 (1.7)	11 270 (1.5)	9602 (1.3)	9933 (1.3)	8031 (1.0)
	30-39	63 103 (8.2)	60 687 (7.9)	22 646 (3.0)	18 208 (2.4)	15 509 (2.0)	13 870 (1.8)	15 511 (2.0)	11 110 (1.4)
	40-49	60 842 (7.9)	62 396 (8.1)	23 563 (3.1)	19 785 (2.6)	17 964 (2.3)	17 136 (2.2)	16 953 (2.2)	12 178 (1.6)
	50-59	47 278 (6.2)	34 920 (4.5)	15 804 (2.1)	9940 (1.3)	15 480 (2.0)	9650 (1.3)	11 058 (1.4)	6056 (0.8)
	60-69	8598 (1.1)	3181 (0.4)	2459 (0.3)	991 (0.1)	1910 (0.2)	598 (0.1)	1920 (0.3)	728 (0.1)
	Subtotal	220 670 (23.2)	200 125 (21.1)	78 558 (8.3)	61 767 (6.5)	62 133 (6.5)	50 856 (5.4)	55 375 (5.8)	38 103 (4.0)
Unemployed	18-29	12 928 (7.1)	15 716 (8.6)	9036 (5.0)	9971 (5.5)	4621 (2.5)	4979 (2.7)	6317 (3.5)	7108 (3.9)
	30-39	5661 (3.1)	9074 (5.0)	5145 (2.8)	9625 (5.3)	2199 (1.2)	3637 (2.0)	2655 (1.5)	4137 (2.3)
	40-49	4945 (2.7)	7974 (4.4)	4103 (2.3)	6721 (3.7)	1856 (1.0)	3626 (2.0)	2821 (1.5)	3837 (2.1)
	50-59	6434 (3.5)	6231 (3.4)	3527 (1.9)	3526 (1.9)	2353 (1.3)	2897 (1.6)	2897 (1.6)	2406 (1.3)
	60-69	1173 (0.6)	191 (0.1)	555 (0.3)	191 (0.1)	326 (0.2)	96 (0.1)	533 (0.3)	131 (0.1)
	subtotal	31 141 (3.3)	39 186 (4.1)	22 366 (2.4)	30 034 (3.2)	11 355 (1.2)	15 235 (1.6)	15 223 (1.6)	17 619 (1.9)
Total		251 811 (26.5)	239 311 (25.2)	100 924 (10.6)	91 801 (9.7)	73 488 (7.7)	66 091 (7.0)	70 598 (7.4)	55 722 (5.9)

*The percentages for age subsets are given with respect to the number of employed (n = 767 587) or unemployed patients (n = 182 159); the percentages for the "subtotal" and "total" groups are given with respect to the whole sample size (n = 949 746).

of patients. The employed vs unemployed differences in prescription rate (ΔNPI) were obtained by subtraction. Statistical significance of the observed differences was evaluated by the goodness-of-fit χ^2 test (23). The expected frequencies (expected number of prescriptions) were calculated on the assumption that NPIs were equal for the compared subgroups. The data were analyzed with Microsoft Excel for Windows. Because of the large sample size, mostly several thousand per block (Table 1), the P level of each χ^2 value was mostly below 10^{-8} (df=1 for each χ^2), often with no practical relevance. For this reason, we additionally computed the effect size of the obtained χ^2 values, with total number of prescriptions per subgroups under comparison as denominators (23), showing the size of the relationship between employment status (independent variable) and NPI (dependent variable). The effect size was accepted as significant if >0.05; as small if=0.1, as medium if=0.3, and as large if=0.5 (23).

Results

Out of 949 746 health insured persons aged 18-69 years, there were 496 821 (52.3%) men and 767 587 (80.8%) employed people. The unemployment rate was higher among women (22.5%; 102 074/452 925) than among men (16.1%; 80 085/496 821).

The average yearly NPI was 32% higher among the unemployed, both men and women, than among the employed (1.317 vs 0.995; χ^2=14458; effect size=0.12) (Table 2). The dif-ference between the employed and unemployed was higher for men than for women (0.565 vs 0.074), but generally more drugs were prescribed to women than to men (NPI 1.181 vs 0.943; χ^2=12715; effect size=0.11), with a difference according to the employment status: employed women used more drugs than men (1.165 vs 0.852; χ^2=18 694; effect size=0.16), but more drugs were prescribed to unemployed men than to unemployed women (1.417 vs 1.239; χ^2=1082; effect size=0.07).

More drugs were prescribed to unemployed than to employed persons in all regions of Croatia (Figure 1). Overall, individual prescription rate was highest in Rijeka (1.099), followed by Osijek (1.094), Split (1.049), and Zagreb (1.038). NPI per employed person was smaller in more populated regions. The difference in NPI between employed and unemployed was highest in Zagreb (0.522), followed by Split (0.211), Rijeka (0.205), and Osijek (0.117). However, in areas with higher unemployment rate, there were relatively less prescriptions issued to unemployed individuals. NPI in Osijek, with 24.7% unemployment rate, was 1.181 compared with 1.485 in Zagreb, with unemployment rate of 8.2%.

In each of the five analyzed age groups, NPI rate was higher for unemployed than for employed persons (Table 3; $\chi2$>1000 for each age group, except the 60-69 group for which $\chi2$=40). A steady increase in the prescription rate with age was evident in all subsets. The highest ΔNPI was registered in the 30-39 age group (ΔNPI=0.563), after which it decreased with age, reaching its lowest value in the 60-69 age group (ΔNPI=0.174). As the number of em-

Table 2. Individual average drug consumption of participants according to the employment status and gender

Employment status	No. of prescriptions per individual (NPI) for			Effect size
	men	women	ΔNPI*	
Employed	0.852	1.165	0.312	0.156
Unemployed	1.417	1.239	0.178	0.067
Total	0.943	1.181	0.238	0.113
ΔNPI†	0.565	0.074		
Effect size	0.220	0.026		

*NPI difference between genders.
†NPI difference between the employed and the unemployed.

Table 3. Individual average drug consumption rates according to the employment status and age

Employment status	Number of prescriptions (NPI) per individual in the age group				
	18-29	30-39	40-49	50-59	60-69
Employed	0.770	0.813	0.909	1.466	2.064
Unemployed	1.047	1.376	1.358	1.719	2.238
Total	0.861	0.903	0.970	1.509	2.088
ΔNPI	0.277	0.563	0.448	0.253	0.174
Effect size	0.151	0.229	0.158	0.063	0.028

Table 4. Individual prescription rates of selected drug categories* according to the working status and gender

	Number of prescriptions per individual (NPI)			
Category	anxiolytics, antidepressants (N05B, N06)	antidiabetics (A10)	antihypertensives (C03, C07-C09)	respiratory drugs (R03, R05)
Employed:				
men	0.105	0.008	0.210	0.013
women	0.182	0.000	0.108	0.033
total	0.140	0.005	0.163	0.022
Unemployed				
men	0.341	0.013	0.152	0.022
women	0.310	0.001	0.114	0.006
total	0.324	0.006	0.131	0.014
ΔNPI	0.184	0.001	0.033	0.009
Effect size	0.413	0.114	0.082	0.167

*Anatomical Therapeutic Chemical (ATC) drug classification groups (22).

ployed or unemployed persons aged over 70 years was very small, this subset was not statistically evaluated to avoid data distortion.

The largest NPI difference between employed and unemployed insured persons (Table 4) was found for psychotropic drugs, anxiolytics and antidepressants. These drugs were prescribed more than twice as much to unemployed patients (0.324 vs 0.140 or +231%; $\chi^2 = 28\ 409$; effect size = 0.41); to unemployed men 10% more than to unemployed women ($\chi^2 = 130$; effect size = 0.05), and to employed women over 70% more than to employed men ($\chi^2 = 8016$; effect size = 0.27). NPI for antidiabetic drugs was also higher for unemployed than employed patients ($\chi^2 = 60$; effect size = 0.11). Employed patients received more antihypertensive ($\chi^2 = 995$; effect size = 0.08) and more respiratory drugs ($\chi^2 = 541$; effect size = 0.17). However, NPI for respiratory drugs was higher among unemployed men than among employed men ($\chi^2 = 390$; effect size = 0.23). The opposite was true for women ($\chi^2 = 2042$; effect size = 0.41). The prescription of these drugs was highest for employed women and lowest for unemployed women.

The combined prescription rate of antidiabetic, antihypertensive, and respiratory drugs to employed individuals was over 35% higher than that of psychotropic drugs (0.190 vs 0.140; effect size = 0.15), while the opposite was true for unemployed patients (0.150 vs 0.324; effect

size = 0.37); unemployed patients used mood modifying drugs more than twice as often as other three drug categories together.

Discussion

Our study showed that the number of prescriptions per individual was much higher for unemployed than employed persons, indicating an association between unemployment and health-related problems, including the relative expenditures. The observed difference between these two social groups consistently appeared in all subsets of the study sample. The effect size varied among the subgroups, implying that the analyzed socio-demographic features are interacting modulators of a complex network.

The links between unemployment and health are numerous: employment may lead to illness, and health problems that may contribute to unemployment often result from unfavorable working conditions at the previous work place. Another factor is insecurity: fear of job loss increases the incidence of anxiety even in emotionally stable persons. Unemployment may lead to illness reinforcing the existing physical disease or as a risk factor for a new one. Unemployment can have strong consequences on mental health, which mainly manifest as depression, anxiety, and alcoholism (7-21). Unfortunately, the existing health system is not in position to deal with a disease stemming from unemployment except through symptomatic interventions, mostly prescribing psychotropic drugs (15,16).

In our study, higher unemployment rate was associated with lower NPI among the unemployed citizens, and partially associated with lower ΔNPI between the employed and unemployed. This seemingly paradoxical relationship between job status and drug consumption in regions with higher unemployment rate (especially in Osijek) may have occurred for several reasons. Unemployed individuals could be less frustrated when surrounded by people of similar socio-eco-

nomic status or the health perception among the employed could be worse if they work part-time, are underpaid, are dissatisfied with their work, or are more sensitive to local socioeconomic hardships (14,24-26). Some researchers found the latter phenomenon particularly emphasized in women (27).

The differences between the two groups were higher for men than for women. Besides, more drugs were prescribed to employed women than to employed men, and to unemployed men than to unemployed women. These data suggest that women in Croatia cope better with unemployment than men, possibly because men are traditionally expected to bear greater responsible for the family welfare.

The effect size and ΔNPI between the employed and the unemployed were largest for the 30-39 age group. This group is at the peak of productivity and have the most demanding family responsibilities, which are probably the reasons why they are most severely hit by the job loss. Our data differed to some degree from those obtained by Šverko et al (7), who found the largest difference in subjective psychological (not physical) health between the unemployed and general population in the 35-50 age group, particularly in the 45-50 years subset. Our results also showed a nonlinear effect of age on the untoward health effects of unemployment: the impact of age increased in the 18-39 group, after which it steadily decreased (Table 3).

The largest difference between the two social groups was shown in the consumption of psychotropic anxiolytics/antidepressant drugs (Table 4), indicating that the unemployed have significantly more mental-health problems (eg, anxiety, depression). Higher prescription of antidiabetic drugs to the unemployed may be explained by the psychosomatic nature of the disease (11,16,28). On the other hand, antihypertensive and respiratory drugs were significantly more prescribed to the employed than to the unemployed. However, the psychosomatic na-

ture of these disorders cannot be denied either (29). An explanation for this could be that certain physical disturbances were more prevalent or perceived earlier among the employed than among the unemployed.

Our study included a small number of variables, lacking those that could additionally delineate the health status, or modulate the investigated relationships, such as general and familial socioeconomic status, education level, former health quality, and the length of unemployment period, concomitant health problems, use of the over-the-counter medicines, and job stress/dissatisfaction. Moreover, our data show the number of prescribed and dispensed rather than actually consumed drugs, which is an indirect measure of drug utilization. In spite of these limitations, the results indicate an association between unemployment and illness. The results could be explained by the negative effect of unemployment and stress on health and vice versa – persons with poorer health are less successfully hired and get fired more easily (8). This effect might be particularly strong in areas with low unemployment rate, in the 30-40 age group, among men, and among persons with some psychological disturbances. It is also possible that a third variable (eg, socio-economic status or self-esteem) influenced both the job status and the health condition, thus creating a mutual link. Conversely, some disorders may be more affected by stress at work than by unemployment stress. Among particular groups of people, the unemployment status could even decrease or prevent some health disorders: short-time work and short-time unemployment may improve health by reducing previous stress caused by job or an overload with social roles (26,28). Even in the case of long-term unemployment, the positive health effects can be achieved as long as these people are provided with a minimum of social security and are allowed to adopt alternative social roles and to participate in useful activities, such as hobbies, community service activities, volun-

teering, or taking a university class or a training course (10,28). Further analyses should also address the issue of losing a job and decreased employability as a consequence of poorer health. It would be important to identify subgroups in which this effect is strongest.

Drug consumption patterns among unemployed persons could be used for planning health care policies, which would be more people-centered, sensitive to inequalities, unemployment, and social poverty, as well as oriented toward prevention rather than symptomatic treatment (30,31). Unemployed individuals require special and systematic care in order to reduce or prevent their health problems, particularly those related to mental health. After identifying such patients, family physicians may use suitable educative and preventive activities. Such prophylaxis could include professional reorientation/rehabilitation, formation of supportive groups, training in stress management, and/or learning the effective coping techniques (32). At the same time, these actions may indirectly enhance the employability of those in poorer health conditions. Drug therapy will then become just a small segment of a comprehensive social intervention.

Acknowledgments

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