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The negative health consequences of unemployment: The case of Poland

Sławomir Kozieł *, Monika Łopuszańska, Alicja Szklarska, Anna Lipowicz

Institute of Anthropology, Polish Academy of Sciences, Kuznicza 35, 50-951 Wrocław 56, PO Box 1180, Poland

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ABSTRACT

In the 1990s Poland began to make a transition to a free-market economy: a transition accompanied by a variety of negative socio-economic developments, most notably a rise in unemployment. The aim of this study is to shed light on the relationship between occupational status (including unemployment) and the risk of cardiovascular disease (CVD), by examining the experience of 542 men and 572 women between the ages of 40 and 50 of the town of Wroclaw in 2006. The Framingham Risk Score (FRS), which uses certain health and life-style parameters to predict the risk of major coronary problems over a 10-year period, was calculated, and the effect of occupational status on the FRS was assessed. The results showed that the FRS varied according to sex and to occupational status, with the highest FRS rating among unemployed men. Thus governmental policies to counter the adverse effects of unemployment should be developed to remedy the problem.

1. Introduction

Over the course of the past two decades, Poland, along with other Central and Eastern European countries has undergone a radical transition, from a centrally planned to a free-market economy. This shift has had many dramatic consequences throughout Polish society. The privatization of state-run enterprises has led to gross discrepancies in income, with nearly every socio-economic segment suffering a decline in the standard of living (Pałaszewska-Reindl, 1998).

With the transition, one's income level became a function of one's educational status (Górecki, 1994). Whereas the Polish wage structure had previously been extremely compacted, during the 1990s a positive correlation between a college degree and the two higher income quartiles developed, while those workers equipped with no more than a primary-school education were concentrated in the two lower income quartiles (Ziemkowski, 2000). Unemployment, nonexistent in 1989, rose to above 16% in 1994 (CSO, 2002a); although it decreased, to 11% in 1998, it soared, to nearly 20%, by 2002 (CSO, 2002b). Among young men and women (aged 20–24) with a university-level education, the unemployment rate is negligible (2.5 and 3.5%), whereas among men and women with only basic vocational skills the rates are 10 and 16%, respectively (Wróblewska, 2002). Although Poland joined the European Union in 2004, the unemployment rate remains, at 11% (CSO, 2007).

Many studies have shown that unemployment has a negative impact on health (Bartley and Owen, 1996). The loss of one's job not only means a financial loss but also can lead to several secondary difficulties, both physical and psychological: the loss of a structured, fulfilling daily life, of a certain social status, and thereby of a variety of supportive social relationships (Warr and Jackson, 1985; Rasky et al., 1996). Martikainen (1990) showed that unemployment significantly increased the mortality rate among Finnish men from 1981 to 1985. After having controlled for all background variables, he found that relative total mortality among the unemployed was 93%

* Corresponding author. Tel.: +48 71 3438675; fax: +48 71 3438150.
E-mail addresses: slawek@antro.pan.wroc.pl (S. Kozieł), Monika.Lopuszanska@antro.pan.wroc.pl (M. Łopuszańska), Alicja.Szklarska@antro.pan.wroc.pl (A. Szklarska), Anna.Lipowicz@antro.pan.wroc.pl (A. Lipowicz).

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higher and the relative death rate from circulatory diseases was 54% higher than it was among men who were employed. Furthermore, unemployment can cause psychological disturbances (Morrell et al., 1994), depression (Dew et al., 1992), and minor psychiatric morbidity (Ferrie et al., 2001), and is associated with hypertension and cardiovascular diseases (Cook et al., 1982). The high rate of unemployment in Poland since 1995 may have a number of serious health consequences, and therefore warrants epidemiological research. This study uses the Framingham Risk Score scale to determine the cardiovascular consequences of employment status.

2. Data and methods

Our database was provided by a screening program, the Program for the Prevention of Cardiovascular Disease, carried out by the municipal health department of Wroclaw, Poland, in cooperation with the Institute of Anthropology of the Polish Academy of Sciences. All of Wroclaw's inhabitants between the ages of 40 and 50 were invited to participate; 25% – 506 men and 642 women – accepted. We are unable to determine whether the participation of these 25% was representative of the population at large. Because we restricted our analysis of this group to those individuals whose data were complete, the sample size shrank to 452 men and 572 women (the data are located in the Institute of Anthropology PASs, Wroclaw, Poland).

The data collected from each participant comprised: (1) a consultation with a cardiologist, including the medical history and a physical examination; (2) a resting electrocardiogram; (3) an assessment of vital signs, including resting systolic and diastolic blood pressure; (4) a measurement of body fat, by means of two anthropometrical indices: BMI (body mass index = weight (kg)/(height (m))^2 and WHR (waist-hip ratio = waist circumference (cm)/maximal hip circumference (cm)); (5) standard laboratory tests, including fasting plasma levels of glucose, total cholesterol, LDL (low density) cholesterol, HDL (high density) cholesterol, and triglycerides; (6) a questionnaire regarding educational level, professional career, various actual life-style elements (including smoking and drinking habits), and the family's social status.

We divided the participants into three groups: professionals, skilled and unskilled workers, and unemployed individuals. The first group included many clerks, teachers, physicians, lawyers, office managers, and business owners. The second group included drivers (taxi, buses, trucks), locksmiths, welders, steelworkers, and mechanics whose education had not gone beyond elementary or trade school. All of those in the third group were currently unemployed. Education level, was defined as one of three categories: university, secondary, and elementary or trade school. 38.5% had attended elementary or trade school; 48% had graduated from secondary school; and 13.5% had received a university degree. While this classification, according to occupation, differs from the socio-economic models used in studies of Western countries, it provides an accurate image of the stratification characteristic of Poland.

The Framingham Risk Score, derived from the Framingham Heart Study cohort, was designed to predict the risk over a 10-year period of an individual's experiencing one or more of several major adverse coronary events, including mortality due to coronary artery disease and non-fatal myocardial infarction (Wilson et al., 1998; D'Agostino et al., 2001). The FRS comprises, in fact, two scores: FRS-LDL, based on LDL cholesterol, and FRS-TCH, based on total cholesterol. In both cases calculations are derived from data on the traditional risk factors for cardiovascular disease: age, sex, LDL-cholesterol level, HDL-cholesterol level, systolic and diastolic blood pressure, the presence or absence of diabetes mellitus, and smoking status (Wilson et al., 1998; D'Agostino et al., 2001). We calculated both of these versions of the FRS, on the basis of the data provided by each participant in the study.

Table 1
Sample characteristics: distribution (%) within three demographic and life-style categories according to sex and occupational status. Differences in distribution were tested by means of Pearson's Chi-square test.

	Professionals	Skilled workers	Unemployment
(a) Males			
Marital status			
Single	16.7	18.7	28.0
Married[a]	83.3	81.3	72.0
		$\chi^2 = 2.03$	
Smoking			
Yes	25.7	38.5	60.0
Never	45.3	28.7	20.0
Ex-smoker	29.0	32.8	20.0
		$\chi^2 = 22.8^{***}$	
Drinking			
Never	3.2	5.6	12.0
Medium	74.2	68.0	60.0
Frequently	22.6	26.4	28.0
		$\chi^2 = 6.14$	

	Professionals	Skilled workers	Unemployed
(b) Females			
Marital status			
Single	27.7	28.8	24.3
Married[a]	72.3	71.2	75.7
		$\chi^2 = 0.49$	
Smoking			
Yes	22.3	36.5	34.3
Never	56.0	44.3	47.9
Ex-smoker	21.7	19.2	17.8
		$\chi^2 = 13.2^{*}$	
Drinking			
Never	5.2	7.8	12.2
Occasionally	89.6	90.4	83.8
Frequently	5.2	1.8	4.0
		$\chi^2 = 8.13$	

	Males	Females
(c) Education		
Education		
University	31.3	32.3
Secondary	38.3	48.1
Elementary or trade	30.4	19.6
	$\chi^2 = 19.6^{**}$	

[a] Includes unmarried couples.
[*] Differences significant at $p < 0.05$.
[**] Differences significant at $p < 0.01$.
[***] Differences significant at $p < 0.001$.

Table 2
Means and standard deviations of health parameters and anthropometry indices by sex and occupational status. Differences between groups were assessed by ANOVA.

	Professionals		Skilled workers		Unemployed	
	Mean	SD	Mean	SD	Mean	SD
Males $N = 506$						
SBP (mm Hg)*	126.43	15.09	129.92	14.73	132.29	20.04
DBP (mm Hg)	83.36	10.11	84.30	10.72	84.75	10.82
TCH (mmol/l)	203.48	40.30	200.27	34.29	220.33	37.50
HDL (mmol/l)**	52.21	11.12	53.73	13.96	48.67	18.31
LDL (mmol/l)	127.78	50.49	122.38	46.41	141.58	63.34
TG (mmol/l)	159.11	108.17	155.18	115.36	158.50	108.18
GLUC (mmol/l)	82.88	24.14	83.64	16.45	89.54	23.25
BMI (kg/m^2)	27.12	3.69	27.40	4.31	26.14	4.32
WHR	0.92	0.06	0.92	0.06	0.92	0.07
Height (cm)*	178.02	6.14	176.55	6.27	176.55	5.43
Waistline (cm)	94.74	9.31	95.30	10.48	92.96	11.91
Females $N = 642$						
SBP (mm Hg)*	116.06	15.16	118.71	16.61	121.18	17.15
DBP (mm Hg)	76.30	9.88	77.39	10.57	78.74	9.97
TCH (mmol/l)	192.88	32.53	195.70	36.49	195.22	30.62
HDL (mmol/l)	65.64	14.65	66.97	13.93	64.25	16.01
LDL (mmol/l)	108.99	29.78	110.65	30.69	110.77	27.75
TG (mmol/l)	93.75	51.19	97.01	47.63	102.77	44.77
GLUC (mmol/l)	78.87	11.09	80.58	11.94	79.97	10.35
BMI (kg/m^2)*	24.12	4.65	24.56	4.29	25.59	4.88
WHR**	0.78	0.06	0.79	0.07	0.81	0.06
Height (cm)**	163.83	5.90	161.94	6.28	162.04	5.78
Waistline (cm)**	78.08	10.05	79.26	11.29	82.88	11.68

* $p < 0.05$.
** $p < 0.01$.

Percentage differences in each category of quantitative traits were assessed by Pearson's Chi-square test. Differences in health and anthropometric parameters were assessed by one-way analysis of variance. The association between occupational status and the FRS according to education level, BMI, waistline and sex was assessed by four sets of multiple regression analysis.

3. Results

The percentage of participants in each of the three occupational categories was broken down according to three life-style variables, including marital status (Table 1). A large majority were married, and remained so. Among both the male and the female participants, the percentage of professionals who had never smoked was exceptionally high (45.3 and 56.0%, respectively), as was the percentage of males in the "unemployed" category who currently smoked (60%). A moderate amount of alcohol consumption was reported by a majority of the participants in all three employment categories. Most of the female participants had finished secondary school, whereas most of the male participants' education ended at the elementary or the trade-school level.

Health parameters indicating each participant's cardiovascular condition were calculated, along with BMI, WHR, waistline and height, as a measure of previous exposure to detrimental conditions (Montgomery et al., 1996), for three occupational categories, again according to sex (Table 2). Among the males, those in the "unemployed" category were at a higher risk according to each of the health parameters studied – in fact, they had the highest value of SBP and the lowest value of HDL – the only significant difference was for systolic blood pressure ($F = 3.74$; $p < 0.05$) and HDL-cholesterol fraction ($F = 5.32$; $p < 0.01$). In addition, there was a considerable height difference ($F = 3.40$; $p < 0.05$) between the males in the "professional" category and those in both of the other employment categories. Among the female participants, four parameters – SBP, BMI, waistline and WHR – revealed significant differences, with those who were unemployed at a distinctly higher risk level. As for height, differences among the three categories were insignificant, and therefore height was omitted from further analyses.

Table 3
Percentage of elevated values of health parameters that are included in calculating FRS for males and females by occupational status.

	Professionals	Skilled workers	Unemployed
Males			
SBP ≥ 140	23.7	31.6	45.8
DBP ≥ 90	35.7	36.2	37.5
TCH ≥ 200	50.6	53.1	66.7
HDL ≤ 35	2.51	6.19	0.00
LDL ≥ 135	37.4	32.1	50.0
GLUC ≥ 100	8.8	13.0	16.7
Females			
SBP ≥ 140	8.7	12.9	19.2
DBP ≥ 90	13.7	18.4	16.4
TCH ≥ 200	37.4	43.6	42.5
HDL ≤ 35	1.17	0.61	1.37
LDL ≥ 135	18.5	20.0	20.6
GLUC ≥ 100	3.2	4.2	1.4

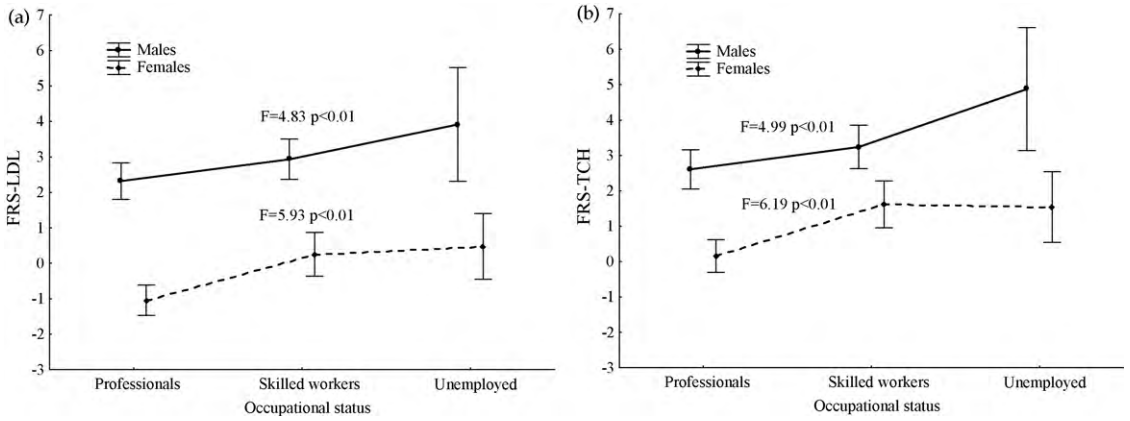

Fig. 1. Means and standard errors by sex and occupational status of the FRS-LDL (a) and the FRS-TCH (b).

Table 4
Regression analysis, dependent variables: FRS-LDL and FRS-TCH (variants of Framingham Risk Scores).

Factor	Beta	*t*	Beta	*t*	Beta	*t*	Beta	*t*
FRS-LDL								
Sex	0.34	11.40***	0.26	9.11***	0.13	3.88***	0.17	4.30***
Education level[a]	0.10	3.49***	0.08	2.50*	0.08	2.66**	0.08	2.61**
Occupational status	0.08	2.58**	0.07	2.43*	0.07	2.17*	0.07	2.21*
BMI			0.29	10.14***			0.12	1.98*
Waistline					0.36	10.56***	0.24	3.50***
FRS-TCH								
Sex	0.23	7.36***	0.17	5.59**	0.07	1.96*	0.09	2.16*
Education level	0.11	3.57***	0.07	2.17*	0.07	2.27*	0.07	2.24*
Occupational status	0.06	1.96*	0.08	2.57*	0.08	2.39*	0.08	2.39*
BMI			0.22	7.13***			0.07	1.06
Waistline					0.28	7.58***	0.21	2.85**

[a] Education level: 0—pooled secondary and high; 1—pooled elementary and trade.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

The most FRS markers, particularly the systolic blood pressure, increase gradually among the males across the three occupational categories. HDL is an exception to this generalization however the unemployed men had still the lowest, adverse value of this parameter (Table 3). Among the female participants, the percentages of elevated values were lower, and the variation according to occupational category was gradual and found in only some of the parameters under consideration (Table 3).

Four regression specifications indicate that occupational status is associated significantly with increased risk of CVD (Fig. 1). This association remains with the inclusion of education level, BMI and/or waistline in the regression, which themselves are significant, implying that occupation related to CVD independently from the possible effects of education level, BMI and waistline size on CVD (Table 4).

For both sexes FRS-LDL means regularly increased across the range of occupational groups, but values for females were higher (Fig. 1a). The FRS-TCH follows a similar pattern, the one difference being that the FRS-TCH among the unemployed participants is not higher than that found among the skilled workers (Fig. 1b). It was also observed that, in both sexes, Framingham indexes were higher in lower educated groups.

4. Discussion

The results of the present study – to the best of our knowledge, the first one to address the question of whether there is an association between unemployment and health in Poland, while controlling for educational status – provides support for the hypothesis that unemployment has a detrimental effect on health, regardless of gender.

The purpose of the widely used Framingham Risk Score is to predict cardiovascular risk in the general population (Wilson et al., 1998). Questions have been raised concerning its value as a diagnostic tool in the case of women and of younger persons of both genders (Chung et al., 2006), but it has proved to be a practical, clinically relevant, and modestly accurate way to arrive at a prognosis and to decide whether intervention is needed. In our sample, mean percentages of the risk of an event in 10 years favor females by a wide margin (2.8% vs. 6.6%; $t = 16.48$; $p < 0.001$). According to risk categories established by Ford et al. (2004), mean value for our entire sample is under 10% and therefore defined as low.

Among the many studies of the association between unemployment and various health outcomes, some cross-sectional and longitudinal ones have focused on the

individual (Cook et al., 1982; Gallo et al., 2006) and others on patterns in populations (Martikainen and Valkonen, 1996). The cross-sectional studies have revealed that unemployment is associated with a slight increase in the risk of coronary heart disease and hypertension (Cook et al., 1982; Janlert, 1992; Brackbill et al., 1995; Gallo et al., 2004; Gallo et al., 2006).

The pathways linking unemployment and physical health are, of course, complex, affected as they are by numerous mediating factors, but researchers consider stress to be the most common cause of health problems among the unemployed (Rozanski et al., 1999; Kubzansky and Kawachi, 2000). Involuntary job loss means the loss of work-based social interaction as well (Iversen and Klausen, 1986). The stress induced by the stigma of unemployment can result in anxiety and depression (Gallo et al., 2004), which are causally associated with an elevated risk of cardiovascular disease (Rozanski et al., 1999). Moreover, job loss and unemployment are associated with smoking, drinking, and poor diet, all of which are independent predictors of cardiovascular disease (Lipowicz and Łopuszańska, 2005). A significant increase in tobacco use among men and women 2 years into unemployment has been found (Matoba et al., 2003). Our study confirms the higher tobacco usage among unemployed men.

The mental stress and the material, including nutritional, deprivations born of unemployment influence not just the person who has suffered a job loss but the family as well. During the early years of Poland's transition to a market economy, a relatively inexpensive diet heavy on low-energy starches replaced a higher energy one, featuring lean meat and fresh fruit and vegetables (Bakken et al., 1999). To make matters worse, stress both inhibits appetite and modifies diet. In one study, 80 men and women were nearly unanimous in reporting that stress altered their eating habits (Willenbring et al., 1986); in another, students reported that stress prompted them to substitute sweets, including chocolate, for fruit and vegetables, and that they consumed less meat and fish (Olivier and Wardle, 1999). This unhealthful diet, along with tobacco and alcohol, could help to explain the increased risk of CVD that has been recorded among the unemployed in Poland.

The existence of a selection mechanism that helps to account for the correlation between health problems and unemployment has been hypothesized (Valkonen and Martikainen, 1995). Preexisting health problems, they argue, diminish a person's chance of finding and retaining a job. This hypothesis seems to be confirmed by a cross-logged longitudinal study of health-care personnel, which found evidence of a correlation between job loss and both mental illness and digestive-system diseases (Heponiemi et al., 2007).

The cumulative effect of disadvantages suffered over the course of a lifetime may help to explain the correlation between ill health and unemployment. Life-course models are constructed on the assumption that childhood health problems, whether or not associated with malnutrition, have long-term consequences, in that they limit educational opportunities and thereby the chance of employment. Children living in poverty often suffer from chronic health problems, which lead to frequent absences from school, leaving them without the skills required for success in the job market (Kuh and Wadsworth, 1993).

The cause of unemployment is more likely to be health-related during a period of rapid economic expansion than during a recession. The health problem in question is usually either a chronic one or a potential one: that is, the unemployed person's behavior is associated with the risk of developing an illness, and therefore puts him or her at a disadvantage in the job market. While this phenomenon has not been found in Sweden (Novo et al., 2000), there is evidence in support of the health-selection hypothesis in that among men height is positively correlated with employment. Male height is positively correlated with good health (Allbeck and Bergh, 1992; Silventoinen et al., 1999), with a lower mortality rate (Samaras et al., 2004), and with upward social mobility (Szklarska et al., 2006). Thus male height is a predictor of a male's chances in the job market. In Styria, a rural region of Austria, men who had secured employment were significantly taller than those who had not (Rasky et al., 1996). One's height at the age of 7, when childhood growth is at its slowest, has been show to be a reliable indicator of one's employment status in early, but not later, adulthood (Montgomery et al., 1996), a finding confirmed by our study. We found no correlation between above-average height and employment except among professionals (of both sexes).

This study's conclusions are limited in several respects, most importantly by the low, 25%, response rate, which means that the sample may have been somewhat selective, in that the education and life-style variables of these 25% could have deviated from that of the population of Wroclaw as a whole (Łopuszańska et al., 2004). The above-average educational level and the better-than-average eating habits of the participants had a buffering effect in regard to the impact of unemployment. What is more, regarding those participants who were employed, we had no data concerning the nature of their employment or the degree of their sense of job satisfaction, factors that may have had a significant influence on the FRS results. Nor did we have any way to determine whether CVD was present in the family background of the participants or any other information about their family environment, factors that are important in calculating the risk of CVD.

Eastern Europe has recently endured far more social, political, and economic turmoil than has Western Europe. The 20% unemployment rate has had a devastating impact on the biological well-being of the Polish people. A study such as this one, of a society in the midst of such an immense transition, helps to clarify the causal relations between socio-economic factors and health (Marmot and Bobak, 2000). This study indicates that unemployment is associated with an elevated risk of CVD; this means that there is an urgent need for the implementation of economic policies designed to reduce unemployment and of public-health-care policies designed to reduce the risk of CVD.

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