Excess Suicide Mortality of Unemployed Women - Selection or Causation?

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INTRODUCTION

Several studies have indicated that unemployment and lack of full-time employment are related to a twofold to over threefold increased suicide or attempted suicide risk [1-8]. In the few studies that have included unemployed women they were found to have at least as high relative suicide risk as unemployed men [1, 9-11] with an exception of a time-series study from Italy [12], where unemployed women's relative risk was two-fold while it was three-fold among unemployed men.

In explaining the association between unemployment and suicide and attempted suicide both selection and causation theories have been considered. According to the first one, the association between unemployment and suicide may be non-causal stemming from pre-existing factors (e.g. socioeconomic status) that predict both unemployment status and suicide risk, or from direct health-related factors (mental health problems, for instance) that increase risk for both unemployment and suicide. Second, unemployment may cause elevated suicide risk by increasing stress or mental health problems or the likelihood of other stressful life-events, e.g., financial problems that predispose to suicide.

Some of the previous studies have concluded that impaired mental health or mental illness have caused both unemployment and suicide, and acted thus as explanatory factors. In some studies socioeconomic factors, like education or occupation-based social class have explained at least some of the association. The problem with these studies have been, that even following the adjustment for many variables, there still has been excess mortality among the unemployed: according to previous study in the Finnish context [11] social class and living arrangements explained or mediated some of the suicide differences between the unemployed and the employed women, but excess mortality of almost 2.3 in non-alcohol-associated and 3.8 in alcohol-associated suicide remained in an 11-year follow-up.

The results of the testing of selection vs. causal hypotheses have provided support for the contention that much of the association between unemployment and suicide or attempted suicide is non-causal and confounded partly by social and socioeconomic factors and partly by pre-existing psychiatric morbidity [1, 13, 14]. Suggestions for a causal effect have also been made on the basis of

data from the UK and Denmark [4, 5], and in addition, a New Zealand work place closure study found that exposure to involuntary lob loss increased the risk of serious self-harm which led to hospitalization or death [15].

The effects of unemployment on total mortality have been studied by examining the association during different general unemployment levels [16]. The results suggest that during periods of favourable economic circumstances, when unemployment can be assumed to be highly selective, the association with total mortality is very large while during the period of high unemployment, when the risk of getting unemployed is considerable the excess mortality of the unemployed is much smaller or non-existent [16]. Such results suggest that the association between unemployment and total mortality obtained from observational studies may be strongly influenced by selection. However, as far as we know, no similar study design has been used to examine suicide mortality.

The objective of this study was to analyse the association between suicide mortality and the experience of unemployment in Finnish women aged 25–64 in the period 1987–2003. The specific aims were to:

1. evaluate the strength of the association between the experience of different length of unemployment and suicide before and after adjusting for two important suicide risk factors, that is socioeconomic status and living arrangements
2. analyse whether these associations vary during different levels of general unemployment

DATA AND METHODS

The data are based on an 11% sample of Finns with an over sample of deaths covering 80% of all suicides, and they were obtained from a register-based data file covering all Finns in the period of 1987–2003. For the purposes of this study we first extracted those women who were 25–64 years on the 31st of December 1987, 1988, 1989, 1990 or 1991, non-institutionalised, and in the labour force (either employed or unemployed), and they were followed for suicide mortality up for 12 months in years 1988, 1989, 1990, 1991 or 1992 respectively. These annual datasets were then aggregated to cover the period of low general unemployment in 1987–1991 (about five per cent). Similarly we constructed data for periods of very high general unemployment (about 15%) in years 1992–1996, and for the most recent five-year period available 1999–2003 (when unemployment rate was between the two previous periods at nine per cent).

Study subjects were classified according to unemployment experience, and four categories were formed: (1) **stably employed** were those who were employed at the beginning of the follow-up and who had been employed for the whole previous year; (2) **unstably employed** were

employed at the beginning of the follow-up but had experienced some unemployment during the previous year; (3) **periodically unemployed** were unemployed at the beginning of the follow-up and had experienced employment during the previous year; (4) **long-term unemployed** were jobless at the beginning of the follow-up and for the whole previous year. Table 1 shows proportions of person-years in each category. Occupation-based social class and living arrangement covering both partnership situation and household composition were adjusted as categorical variables.

The outcome measure in this study was suicide mortality as stated in the death certificate (in 1987–95 ICD9 codes E950–E959 and in 1996–2003 ICD10 codes X60–X84 and Y870). Hazard ratios for suicide were calculated using Cox regression models, with sample design weights used to take account of the over sample of deaths. The stably employed -category was used as the reference group.

RESULTS

Women who had experienced any length of unemployment had a higher suicide mortality risk compared to the stably employed (Table 1): unstably employed had 1.35-fold higher adjusted suicide hazard ratio, periodically unemployed had almost three-fold increased risk, while among the long-term unemployed women the risk was over three-fold. The adjustment for social class and living arrangements had very little effect on the hazard rations.

Overall, relative suicide risks of the unemployed were high irrespective of the general unemployment level (Table 2). However, during the period of low unemployment (the first period) suicide risk was highest among periodically unemployed (HR=3.27). When unemployment rate was very high (the second period), long-term unemployed had the highest suicide mortality (HR=3.21) During the latest period, when the level of general unemployment was between the previous two, the relative suicide rates of the two unemployed categories were higher than before, and among women long-term unemployed had a particularly high risk (HR=4.50).

DISCUSSION

We studied the association between experience of unemployment and suicide mortality among women during three periods of different general unemployment rate. Adjustment for social class and living arrangements decreased age-adjusted relative rates only little, and compared to the stably employed relative suicide risk was much higher among those who had experienced any length of unemployment during the previous year. Furthermore, this result held during both very low (5%) and high (15%) national unemployment rate. The long-term unemployed mostly had the highest relative risks.

In accordance with most previous studies [1, 9-11], we found that relative suicide risk among the unemployed women is at least as high as among unemployed men. The one exception from this congruence is a study from Italy [12], where unemployed women's relative risk was two-fold while it was three-fold among unemployed men. The authors suggested that the lack of job has a different influence on the two sexes, and that the possibility to choose a housewife role offers women an alternative to unemployment and an accepted social status. However, the possible feelings of deprivation of social identity will most probably vary between societies. For example, in Finland employment rate among mothers with youngest child aged 3 years or more is one of the highest in the OECD-countries [17], and the very high relative suicide risk among women in this study possibly tells that in such circumstances staying at home is hardly an option to be reckoned with.

Non-causal model hypothesis

According to a previous study [11] occupation-based social class has explained and living arrangements mediated some of the employment status differences in female suicide. On the grounds of those results we adjusted for these variables as confounding factors, but the adjustment had very little effect on the risks. Even following this adjustment periodically and long-term unemployed women had about three-times higher relative suicide risk. A very similar result was obtained in New Zealand when unemployment association with suicide was comparatively unaffected after controlling for, among others, income, education, and marital status [1].

We further assessed the possible selection effect by comparing the suicide mortality between times of very low and high general unemployment. If selection on the basis of pre-existing social, behavioural or psychological factors or poor health took place, its effect should be stronger during times of low unemployment, and relative suicide differences should accordingly be larger. According to a Finnish study on *total* mortality during the same years [16] as unemployment rose during the recession, more healthy people became jobless, and also other characteristics of the unemployed resembled those of the employed. This appeared as lower relative total mortality among jobless during the period of high unemployment. However, in this study the relative suicide risks of the unemployed were very similar during eras of different general unemployment. Especially, the long-term unemployed had very high relative suicide risk during the period of high unemployment. Overall, these results thus suggest little support for the selection theory.

Causal model hypothesis

Unemployment may have effects that appear when joblessness is prolonged. In this study these effects should appear as higher suicide mortality when unemployment has become long-term. The relative

suicide risk was much larger for the long-term unemployed during the period of high unemployment and, especially, during the latest time period. Thus, especially in times when unemployment is not particularly low, suicide risk seems to increase as unemployment is prolonged.

According to Bartley [16] the pathways of these long-term impacts include financial anxiety, long-term stress related to job-loss, changes in health-related behaviour, and accumulation of unemployment experiences. According to Mäki & Martikainen [11] income differences in female suicide mortality were explained by employment status, and a similar result of small mediating role of financial stress was obtained by Blakely, Collings & Atkinson [1]. It thus seems that it is not financial anxiety, but the situation of not having a work that is significant. Keefe et al. [15] found support for long-term stress related model in a work place closure study: an 8-year follow-up revealed that involuntary job loss increased the risk of serious self-harm which led to hospitalization or death. Changes in health-related behaviour following commence of unemployment might also be involved: relative suicide risk among the unemployed is much higher when alcohol intoxication is one the contributory causes of death [11]. As this study showed little support for the selection theory, unemployment may increase suicide through health-related behaviour including alcohol misuse.

CONCLUSION

The excess suicide mortality among the unemployed was not explained by occupation-based social class and living arrangements, and the relative risks remained very similar irrespective of the general unemployment level suggesting little support for the selection theory. Instead, unemployment seemed to have long-term causal effects that increased suicide when unemployment was prolonged.

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Table 1. Number of suicide deaths and relative suicide mortality among Finnish women by employment status.

		Model 1	Model 2	
Employment status	Number of suicide deaths	Adjusted for age	Model 1 + adjusted for social class and living arrangements	(95% CI)
Stably employed	843	1.00	1.00	
Unstably employed	91	**1.36**	**1.35**	(1.08-1.68)
Periodically unemployed	242	**2.90**	**2.82**	(2.44-3.26)
Long-term unemployed	105	**3.43**	**3.35**	(2.71-4.14)

Table 2. Relative suicide mortality among Finnish women by employment status during periods of different general unemployment level

Period	Employment status	Adjusted for age, social class and living arrangements	(95% CI)
1987-1991	Stably employed	1.00	
Unemployment rate 5%	Unstably employed	1.46	(0.95-2.23)
	Periodically unemployed	**3.27**	(2.47-4.32)
	Long-term unemployed	**2.44**	(1.01-5.95)
1992-1996	Stably employed	1.00	
Unemployment rate 15%	Unstably employed	1.28	(0.88-1.86)
	Periodically unemployed	**2.51**	(2.00-3.14)
	Long-term unemployed	**3.21**	(2.38-4.35)
1999-2003	Stably employed	1.00	
Unemployment rate 9%	Unstably employed	**1.52**	(1.07-2.18)
	Periodically unemployed	**3.28**	(2.51-4.30)
	Long-term unemployed	**4.50**	(3.20-6.33)