Introduction

There is strong evidence that people’s current health situation is dependent on earlier life circumstances. During recent decades, a growing interest in life-course epidemiology has emerged within the research on the development of social inequalities in health. Three models of life-course epidemiology have been identified (critical periods, accumulation and pathways) and recent reviews favour the accumulation model because of its predictive power, aetiological insights and social policy implications.

A question that has rarely been analysed within the accumulation hypothesis of life-course epidemiology is how the accumulation of unemployment over time might influence health outcomes. Length of unemployment and health-related outcomes: a life-course analysis

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Background: Most previous studies on the effects of length of unemployment on health have focused on the duration of continuous spells of unemployment rather than on the cumulative length of intermittent spells. This study analysed the relationship between the cumulative length of intermittent spells of unemployment and different health-related outcomes using data from a longitudinal study of school leavers. Methods: All pupils who completed compulsory schooling in 1981 in a medium-sized town in northern Sweden (N=1083) were followed for 14 years with repeated questionnaires including questions about unemployment, health and health behaviour. Results: Men tended to react with a steady state or a levelling off of health symptoms with increased unemployment, whereas women showed deteriorating health symptoms. For health behaviour the reverse occurred. Women’s health behaviour was less connected with increased unemployment while men’s health behaviour tended to deteriorate. Conclusion: Cumulative length of unemployment is correlated with deteriorated health and health behaviour. Long-term unemployment, even as a result of cumulated shorter employment spells over a number of years should be an urgent target for policy makers.

Key points

- Childhood deaths from injuries in the WHO European region are decreasing.
- In contrast, inequalities in unintentional injury mortality between LMIC and HIC have widened between 2000 and 2011.
- Policymakers need to give renewed attention to prevent childhood injuries in LMIC.

References

in most Organization for Economic Co-operation and Development (OECD) countries, it is not possible to remain unemployed (meaning being without work, seeking unsuccessfully for work and being able to take work) for more than a limited period. However, even if the disparate unemployment periods are limited in time, many such periods (interrupted by casual work, labour market measures, studies etc.) can add up to a considerable time of temporary or insecure labour market positions. While the health consequences of short-term unemployment have been increasingly studied and are well-established for both men and women a question that remains unanswered is whether the accumulation of unemployment will have health effects on individuals.

Will increasing accumulation of unemployment be followed by a deterioration in health, or will there develop a steady-state situation after sometime or will the association diminish over time? Will repeated exposure lead to some sort of immunity or not?

Only a few studies have been performed within the field (for an overview of earlier research, see Winefield and Tiggemann). Warr et al. found no correlation between length of unemployment and psychological distress among recent school leavers. Rowley and Feather in a study of young men, however, found a positive relation between length of unemployment and psychological distress. But another study by Jackson and Warr showed that psychological well-being, after an initial increase, tends to decrease after approximately 1 year of continuous unemployment, even if there is no improvement in the financial situation (see also Warr and Jackson). They suggest a curvilinear relation between length of unemployment and psychological distress with a maximum of distress after approximately 6 months followed by decrease (‘adaptation’). In similar studies, Winefield and Tiggemann tested this hypothesis. In the first study, they found a support for the curvilinear hypothesis among teenagers, but in the second study, which focused on young adults, this result could not be replicated. Although there were consistent sex differences at school, most of the variables were no longer evident later. The interpretation was that length of unemployment has different effects on the well-being of teenagers and young adults.

In a prospective cohort study, we found that when comparing the odds ratios for an increase in nervous complaints and depressive symptoms between the age of 16 and 21, the longer the unemployment period, the higher the odds ratio for increases in symptoms during the 5-year follow-up period. The results were similar in young men and young women. In a longitudinal study of men from age 16 until age 33, Wadsworth et al. found that the accumulated experience of unemployment, the worse was the health situation at age 33. The results persisted after controlling for early health status and socioeconomic position. Also, earlier research has shown that unemployment in young people, for both men and women, can have lasting negative effects for later employment.

So far, the literature on unemployment and health has proposed three different possibilities of development, except for the situation where there is no demonstrable effects at all of unemployment.

The first model represents the traditional dose–response view—the longer the unemployment, the more of the health-related outcome. The second model illustrates a steady-state outcome—after a certain level of effect additional unemployment will not add anything more; the level is unchanged. The third model suggests that after a maximum is reached more unemployment will result in a lower value of the effect variable, or ‘adaptation’ to the unemployed role. In addition to these patterns, there are also possible ‘threshold’ situations, meaning that there is a minimum requirement of unemployment duration before any effect can be expected. Besides we should not forget the situation of reversed causation, i.e. that impaired health could be the ground for unemployment, but that situation is not analysed here.

It is possible that most health outcome will be affected in the same way, but it could also be that some outcomes follow one path, e.g. the dose–response pattern, while other outcomes may follow others (e.g. steady state or adaptation). It is also possible that different individuals (according to e.g. gender) will react differently to unemployment.

The aim of this study was to analyse the relationship between the cumulative length of unemployment and different health-related outcomes in a 14-year follow-up of school leavers. Specifically we were interested to analyse if these relations were cumulative, steady state or if they decreased after a time and if there were different patterns among men and women.

**Methods**

This study was based on a cohort study of all 1083 pupils who, in 1981, attended or should have attended the last year of compulsory school (age 16) in a medium-sized industrial town in the north of Sweden. Initially all the pupils were investigated with a comprehensive questionnaire and the sample was followed for 14 years. After the start of the study, information was collected through questionnaires at ages 18, 21 and 30. The questionnaires contained a number of questions about health and health-related behaviours. The reports on occupational status (unemployed, not unemployed) were collected retrospectively at age 18, 21 and 30 back to the previous age of data collection (for age 18, we asked back to age 16, for age 21, we asked back to age 18, etc.), using a matrix were the participants for each half year (autumn and spring) filled in what were there main occupation during that half year. If they only ticked one alternative that represented 6 months, if they ticked two alternatives each alternative was set to represent 3 months etc. By adding all this information, we got the cumulated unemployment time. If data were missing, participants were contacted by phone for a personal interview regarding their occupational history. Details of the study design are described elsewhere.

The study has had a very high response rate. Of the original cohort members in 1981, (1083 pupils), 96.6% (corresponding to 1046 individuals) were still participating after 14 years (26). Details of how this low dropout rate was attained have been presented elsewhere.

In this study, participants were grouped according to unemployment length. The unemployment measure used was the accumulated unemployment (in months) recorded from the identification of the cohort in 1981 until 1995. In total, this period comprised 168 months (14 years). In the analysis, total unemployment duration was grouped into half-year periods: the unemployment exposure levels studied were 0 (no unemployment at all), 6 (up to 6 months of unemployment), 12 (up to 12 months of unemployment) and so on up to 54 (denoting those with 48 months or more of unemployment). A longstanding cumulated unemployment also indicates a high number of unemployment periods, as—according to Swedish law during the period 1981–1995—it was not possible to get unemployment compensation for more than 1 year below the age of 50 (for those under 20, the period was restricted to half a year). When the maximum time for unemployment benefits had been reached, the unemployed were offered some sort of labour market arrangement for at least half a year, during which they could qualify for a new period of unemployment compensation. A cumulated unemployment of 4.5 years, thus, indicates at least five unemployment periods, interrupted by these labour market programmes or other work opportunities. The number of individuals assigned to the different levels is presented in figure 1.

**Measures**

The following health-related variables were tested as outcome variables at age 30:

- **Poor self-assessed health**: health perceived as not good in a three-graded scale (good, bad and something in between).
- **Somatic symptoms**: measured in a composite index based on 26 different somatic symptoms (e.g. bronchitis, lumbago...
To follow the adaptation pattern, i.e. after an initial increase of health outcome and duration of unemployment, which we referred to as dose–response, indicating a mainly positive correlation between health outcome and duration of unemployment (figures 2 and 3).

Results

Table 1 shows the prevalence of the used dependent variables for men and women at 30 years of age (%).

<table>
<thead>
<tr>
<th>Measure</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not good health</td>
<td>22.1</td>
<td>25.8</td>
</tr>
<tr>
<td>Somatic symptoms</td>
<td>20.5</td>
<td>30.8</td>
</tr>
<tr>
<td>Depressive symptoms</td>
<td>7.5</td>
<td>11.7</td>
</tr>
<tr>
<td>Visit to physician last year</td>
<td>54.1</td>
<td>67.8</td>
</tr>
<tr>
<td>Daily smoking</td>
<td>27.2</td>
<td>35.4</td>
</tr>
<tr>
<td>High alcohol consumption</td>
<td>49.4</td>
<td>49.5</td>
</tr>
</tbody>
</table>

Discussion

The study revealed a negative or steady-state relationship between accumulation of unemployment during a 14-year period and different health-related outcomes. According to our knowledge, this is one of the first studies to demonstrate that accumulation of unemployment over such a long period does not lead to a health-related adaptation but rather to a steady state or deteriorated relation to various health outcomes over the period. Surprisingly, these results were found in a country like Sweden, well known for low unemployment rates and active labour market policies to counteract the unfavourable effects of prolonged unemployment.

Our focus on analysing cumulative (as opposed to continuous) unemployment is supported by Dooley and Prais28 who have proposed that a distinction between adequate and inadequate employment makes more sense in the current economic climate than a distinction between employment and unemployment. This is because, in many countries, the official unemployment rate is low, yet, at the same time, many employed people are economically disadvantaged (or ‘underemployed’) over a long period of years. The underemployed experience various types of temporary solutions from unemployment to labour market measures and various temporary employment contracts or studies.

Dooley and Prais28 proposed an analysis of employment as a continuum, which includes several categories of inadequate employment (or ‘underemployment’), including unemployment, insufficient hours, insufficient pay and intermittent unemployment. The last category includes people who are currently adequately employed, ‘but who had been unemployed for 15 or more weeks during the previous year, or who had three or more spells of unemployment during that time’ (p. 52). They reported that the negative health effects of underemployment were generally similar to the negative health effects of unemployment in a national longitudinal cohort study of young people conducted in the United States from 1979 to 1994.

In our study, the relations between length of unemployment and health-related outcomes were quite different for men and women. Among women there seemed to be a cumulative relation between unemployment and self-assessed health, somatic symptoms and depression, among men between unemployment and depression, smoking and high alcohol intake. If we make a distinction
between health (including self-assessed health, somatic symptoms and depression) and health behaviour (including visits to a physician, smoking and alcohol consumption), we can observe that the relations are more pronounced for unemployment and health among women and for unemployment and health behaviour among men.

The situation of being unemployed includes a variety of negative experiences (e.g. lack of money or hope for the future, gibes from neighbours), some of which a person could cope with in a decent way, and other which are more difficult to handle and will continue to affect the unemployed in a negative way. The experience of being unemployed could be different for men and women even though our earlier research has demonstrated that in a context of high participation rate of women in the labour market men and women are quite equally hit by the health consequences of accumulated unemployment during a 3-year period. Even so, we are aware that the health consequences of a stressful situation could be expressed differently by men and women. A stressful life event could, for example, lead to various health-related symptoms among women and men.

This study does not answer the question of why there is a correlation between certain health-related outcomes and length of unemployment—and it cannot prove that it is a causal relation, although one of the indications for a causal relationship, according to Bradford Hill, is a dose–effect relationship as shown in some of our graphs. The cohort included only 1000 people, and the number of people exposed to a certain level of cumulative unemployment will decrease for increasing levels of unemployment.

Figure 2 Odds ratios (OR) regarding different health problems for different levels of unemployment length, adjusted for earlier health status and parental socioeconomic position. Full line = odds ratios, dotted lines upper and lower 95% confidence interval.
This resulted in power limitations and wide confidence limits for very long cumulative unemployment.

The strengths of this study were a long follow-up period and an exceptionally low attrition rate. To avoid health selection, we have also been able to control all outcome variables for the corresponding variable at the beginning of the study (except for self-assessed health). One reason why, so far, there has been little research in this area is that it requires longitudinal research, with a long follow-up time, low attrition rate and measurement of both exposure and outcome.

Conversely, there are also weaknesses: the cohort size was rather small, which will give power problems when it comes to long unemployment periods. The decreasing number of observations with very long unemployment experience resulted in broad confidence limits for longer unemployment periods.

The period for which we have cumulated unemployment in this study includes different periods in a trade cycle. The unemployment levels in this cohort, however, did not show substantial differences between booms and recession. A study by Novo et al. partly including this cohort, did not show any significant differences in somatic or psychological symptoms among the unemployed during a boom compared to a recession (however, there were differences in the employed group). We cannot rule out the importance of trade, which need deeper analyses in future studies. It is also possible that trade have different meaning in different ages. It cannot be ruled out that some of the cumulated unemployment relate more to the recession period from 1991 an onwards, but in most cases the unemployment load is well correlated over time. As the available measure of unemployment could not make a distinction between continuous and discontinuous unemployment, we had

Figure 3 Odds ratios (OR) regarding different health behaviours for different levels of unemployment length, adjusted for earlier health status and parental socioeconomic position. Full line = odds ratios, dotted lines upper and lower 95% confidence interval.
not possibility to analyse that. In most cases in these age groups, unemployment periods are relatively short interrupted by periods of work or studies.

This article builds on the study of the effects of unemployment reported by Wadsworth et al. in the UK, but extends their findings in two important respects. First, we looked at women as well as men, and second, we looked at the effects on health behaviours as well as health symptoms. With accumulating unemployment over time, we find different patterns between men and women. Among men health problems level off over time while unfavourable health behaviours increase. Women, by contrast show a continued increase in health symptoms with increased unemployment, but no change in health behaviours. Policy makers need to be aware of the fact that not only long-term unemployment but also the accumulation of intermittent spells of unemployment can have negative health consequences in both men and women, although the effects are different.

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**Conflicts of interest:** None declared.

**Key points**

- A dose–response correlation was observed between cumulative length of unemployment and for men health behaviour for and for women health status.
- There was no general adaptation to increasing unemployment load when it comes to health behaviour.
- To diminish long-term unemployment, even as a result of cumulated shorter employment spells during a number of years, should be a an urgent target for policy makers.

**References**