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Are the health consequences of temporary employment worse among low educated than among high educated?

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Background: Despite the inconsistent findings of the growing amount of research analysing the possible health consequences of temporary employment, there is a lack of heterogeneous perspectives. The aim of the study was to analyse whether the health consequences of temporary employment are worse among low educated compared with high educated, after control for health-related selection. **Methods:** A 26-year follow-up study of a cohort of all school leavers in a middle-sized industrial town in northern Sweden was performed between 1981 and 2007. Of those still alive of the original cohort, 94% participated during the whole period. For this study, a sample of participants with temporary and permanent employment contracts between the age of 30 and 42 years was selected ($n = 660$). **Results:** In multivariate logistic regression analyses, an additive synergistic interaction effect was found for low education and high exposure to temporary employment in relation to suboptimal self-rated health, after controlling for health-related selection and sex. An additive antagonistic interaction was found between low education in combination with high exposure to temporary employment in relation to psychological distress, whereas no interaction was found for depressive symptoms. **Conclusion:** Our hypothesis regarding worse health effects of temporary employment among low educated was partly confirmed. Our results indicate the need to analyse temporary employment from a more heterogeneous perspective as well as in relation to different health outcomes.

Keywords: additive interaction, education, longitudinal studies, self-reported health, temporary employment

Introduction

There is a growing amount of research analysing the possible health consequences of temporary employment.[1–3] Ambiguous and inconsistent findings of these studies have given reason to criticize the tendency to regard temporary employees as a more homogeneous group than has previously been recognized. In addition to the heterogeneity of contracts, recent research within the field has emphasized the importance of variations in work attitudes, contract motives and preferences, perceived job conditions, the degree of job insecurity as well the degree to which temporary employment is voluntary.[4,5] In addition to these psychological dimensions, several socio-demographic divisions may be of importance.

Earlier theoretical and empirical research,[6] which states that employment contracts can be viewed in terms of a centre-periphery dimension, indicates the need to analyse the educational level among temporarily employed people. In a centre-periphery perspective, the most stable temporary contracts are found among high-educated closer to the centre, whereas the most unstable temporary contracts are found among low-educated closer to the periphery. Moreover, several scholars[7,8] argue that poorer work conditions (social, physical and psychological), financial hardship and perceived insecurity, tend to concentrate among lower educated people on the periphery, whereas highly educated people (for instance research project workers and outsourced IT experts) have better work conditions. However, the work stress may be higher among high-educated temporarily employed, for example, among project workers. Even though education seems to be a major structure in temporary employment, there is a lack of research analysing the impact of education on the relationship between temporary employment and health outcome. There is a need for studies examining whether the level of education causes inequality in the health effects of temporary employment.

Although the healthy worker effect is strong in temporary employees,[9] most studies within the field cannot control for health-related selection as they are cross-sectional. Thus, there is a need for longitudinal analyses of the associations between temporary employment and health status.

The aim of this study was a longitudinal analysis to ascertain whether the health consequences of temporary employment are worse among low educated than among high educated, after control for health-related selection.

Methods

Participants

This 26-year follow-up study includes all pupils who in 1981 attended, or should have attended, the last year of compulsory school (age 16 years) in all schools in a medium-sized

industrial town in the north of Sweden, the so-called Northern Swedish Cohort. The attrition rate was extremely low. At the 26-year follow-up, 93.9% ($n = 1006$) of those still alive of the original cohort ($n = 1083$) continued to participate. For this study, a sample was selected with the following combinations of employment contracts between the age of 30 and 42 years: permanent employment during the whole 12-year period or temporary employment during at least 10 months ($n = 660$). The following groups were excluded from this analysis: entrepreneurs, people on long-term sick-leave/disability pension, long-term unemployed as well as those who were studying or were out of the labour market for other reasons (such as travels etc.).

All participants were investigated at 16, 18, 21, 30 and 42 years of age with a comprehensive questionnaire as well as with register data. Data were collected by group questionnaires at 16 and 18 years of age during school hours, and at 21, 30 and 42 years of age, the participants were invited to reunions with their former classmates. Those who could not attend these reunions (and those at the age of 18 years who had finished school) received a mailed questionnaire. If data were missing, the participants were contacted by phone for supplementary information. More detailed descriptions of the method have been published elsewhere.[10,11] For this study, the follow-ups at age 30 years and 42 years were used.

The questionnaire consisted of about 90 questions and the following variables were used in this study: exposure to employment contract, education and self-reported health status. The same but age-adjusted questionnaire was repeated at the follow-ups. The questionnaire was derived from well-known and validated questionnaires such as the Swedish National Survey of Living Conditions[12,13] and the Low-Income study.[14]

The study has been approved by the Regional Ethics Vetting Board in Umeå.

Measures

Exposure to temporary employment

Employment positions during the 12-year follow-up period were measured at age 42 years through a matrix of time, divided into 24 6-month periods. For this study we used the questions in the matrix about labour market position for each 6-month for permanently employed and temporarily employed (measured with six questions about project/object, substitute, probationary, on demand, seasonal and other fixed-term contracts). If one option was marked it was counted as 6 months, if two options were marked, both were counted as 3 months and in the case of three options each was counted as 2 months. 'Exposures' to employment contract (permanent or temporary) were then calculated in months, separately for each year as well as for the whole 12-year follow-up period. The following exposure variables were calculated from the matrix.

(1) For figure 1, the following variables were constructed for each year from 30 to 42 years of age: permanent employment per year—defined as permanently employed during the whole 12-month period. Temporary employment per year—defined as the 75th percentile of the distribution of temporary employment during each 12-month period (which is ≥1 month).
(2) For all other analysis, labour market position between 30 and 42 years of age was calculated in the following way. Permanent employment was defined as being permanently employed during the whole 12-year period (in total 144 months) and was classified as 0 ($n = 401$). Temporary employment was defined as being in any of the six types of temporary employment for a total time of more than 10 months (75th percentile) during the 12-year period and was classified as 1 ($n = 259$).

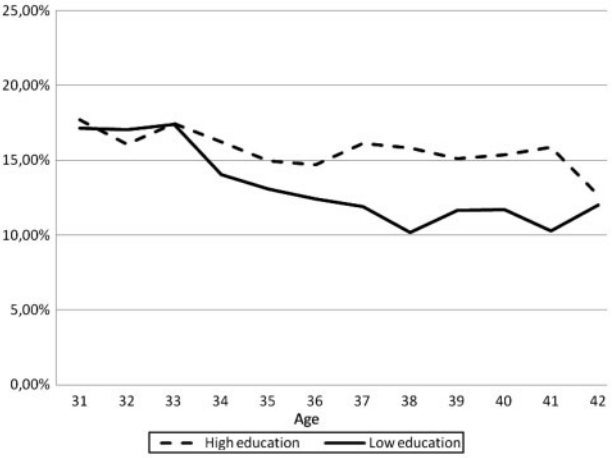

Figure 1 Distribution of temporary employment as a percentage of permanent employment among high- and low educated during the 12-year follow-up

Demographic characteristics

Low education at the age of 42 years was measured with one question about highest educational level. Those with university exam were defined as the high educated (36.6%), whereas those with upper secondary school education or less were defined as the low educated (63.4%).

An additive interaction variable was created by combining the two variables 'education' and 'labour market position between age 30 and 42 years' into four categories (1 = high education, low exposure to temporary employment; 2 = high education, high exposure to temporary employment; 3 = low education, low exposure to temporary employment; 4 = low education, high exposure to temporary employment) with 1 as reference category.

Sex was measured as men = 0, women = 1.

Health outcomes at age 42 years

'Suboptimal self-rated health' was measured with a question about estimated health status.[15] The question had three answer alternatives and was coded as good = 0, poor or something in between good and poor = 1.

'Psychological distress' was measured with a validated scale from the Swedish Survey of Living Conditions.[16] The scale consisted of questions about symptoms during the last year with the answer alternatives 'yes' (coded as 1) or 'no' (coded as 0). The index of psychological distress included 6 items on restlessness, concentration problems, nervousness, palpitations, anxiety and other psychological distress. The range of the index was from 0 to 6, with higher values corresponding to more psychological problems.

The proportion over the cut-off point (≥1 symptom) of the 75th percentile was defined as those with psychological distress. Those below the cut-off point (<1 symptom) were defined as not having psychological distress.

The variable 'depressive symptoms' were measured with one question about how often they had felt depressed during the past 12 months. The variable had four answer alternatives and was dichotomized as often = 1, never, sometimes or rather often = 0 (as close to the 75th percentile as possible).

Indicators of health-related selection at age 30 years

As indicators of health-related selection, we used the same variables as at age 42 years (suboptimal health, psychological distress and depressive symptoms) but with the values from the survey at age 30.

Statistics

Windows version 18.0 of SPSS was used for data analysis. A *P*-value <0.05 or a 95% confidence interval (95% CI) for the odds ratio (OR) was chosen as statistically significant.

The indices of exposure and outcome variables were dichotomized at the 75th percentile (or as close to it as possible), in order to analyse more extreme groups than the median would have given.

Exposure to temporary employment was measured with a specially constructed battery of questions where the participants were asked to report how long they had been working in different kinds of employment. A test–retest analysis of the matrix has been performed, in which phone interviews were performed with a random sample of 100 participants about employment patterns of the matrix for the 12-year period. The results for exposure to temporary employment were identical in the test–retest analysis.

Multivariate logistic regression analysis was used to estimate the OR with 95% CI for the health outcome in relation to temporary employment as well as to low education in different models (table 1). Model 1 includes bivariate OR, whereas sex was introduced in Model 2. Model 3 is controlled for both sex and health-related selection.

Possible interaction was assessed with additive interaction analyses[17] in multivariate logistic regression analysis (table 2) for the combined variable labour market position between 30 and 42 years of age and education. Relative excess risk due to interaction (RERI) is a measure of additive interaction.[17,18] RERI was calculated as a relative measure of the strength of the interaction effect for each outcome. In the absence of interaction, RERI will be 0; a positive value indicates a synergistic interaction and a negative value indicates an antagonistic interaction. The 95% CIs for RERI were calculated according to Hosmer and Lemeshow.[19] An interval not including 0 indicates a significant interaction on the 0.05 level.

Figure 2 gives a graphic illustration of the different interaction patterns between education and exposure to temporary employment for the three different outcomes.

Results

Figure 1 shows the distribution of temporary employment as a percentage of permanent employment among high- and low educated during the 12-year follow-up.

The figure demonstrates the overall decrease of temporary employment with age, especially among the low educated. Temporary employment was most common among high educated throughout the follow-up, except for the first 3 years. The education-related difference increased with age from 35 years until the age of 41 years, while no difference was seen at age 42 years.

Table 1 shows the prevalence of poor health at both ages as well as the logistic regression analyses for the health outcomes.

The table 1 shows an increase in suboptimal self-rated health and psychological distress among both permanently and

Table 1 Multivariate logistic regression analyses

	Per cent		Model 1	Model 2	Model 3
Suboptimal self-rated health	Age 30	Age 42	OR (CI)	OR (CI)	OR (CI)
Permanent employment	16.0	28.1	1	1	1
Temporary employment	32.8	40.7	1.76 (1.26–2.44)	1.72 (1.23–2.42)	1.38 (0.96–2.00)
High education	19.0	29.1	1	1	1
Low education	25.0	35.7	1.35 (0.97–1.90)	1.39 (0.99–1.95)	1.26(0.88–1.82)
Psychological distress					
Permanent employment	12.7	26.4	1	1	1
Temporary employment	30.1	47.9	2.56 (1.84–3.56)	2.29 (1.63–3.21)	1.90 (1.33–2.71)
High education	19.6	33.5	1	1	1
Low education	19.5	35.8	1.11 (0.80–1.54)	1.20 (0.86–1.68)	1.21 (0.85–1.72)
Depressive symptoms					
Permanent employment	10.2	7.0	1	1	1
Temporary employment	13.9	13.5	1.86 (1.36–2.56)	1.83 (1.07–3.13)	1.79 (1.04–3.08)
High education	14.2	7.7	1	1	1
Low education	10.0	10.8	0.82 (0.60–1.22)	1.57 (0.90–2.76)	1.68 (0.95–3.00)

Logistic regression analyses for three health outcomes at age 42 years in relation to exposure to temporary employment from age 30 to 42 years as well as to low education [OR (95% CI). Prevalence of poor health status at age 30 and 42 (per cent).]
Model 1: bivariate analysis
Model 2: multivariate analyses after controlling for sex
Model 3: multivariate analyses after controlling for sex and health-related selection

Table 2 Additive interaction analyses

	Suboptimal self-rated health	Psychological distress	Depressive symptoms
High education—low exposure	1	1	1
High education—high exposure	0.89 (0.55 to 1.43)	1.68 (1.03 to 2.74)	2.24 (0.92 to 5.46)
Low education—low exposure	0.82 (0.46 to 1.49)	2.89 (1.64 to 5.10)	2.33 (0.89 to 6.14)
Low education—high exposure	1.69 (1.01 to 2.83)	2.45 (1.45 to 4.15)	3.13 (1.28 to 7.63)
RERI (95% CI)	0.98 (0.77 to 1.19)	–1.12 (–1.16 to –1.08)	–0.44 (–0.62 to 0.22)

Multivariate logistic regression analyses for three health outcomes at age 42 years in relation to the combined variable education/exposure to temporary employment from age 30 to 42 years, after control for sex and health-related selection [ORs (95% CIs)]. RERI with 95% CI for each health outcome

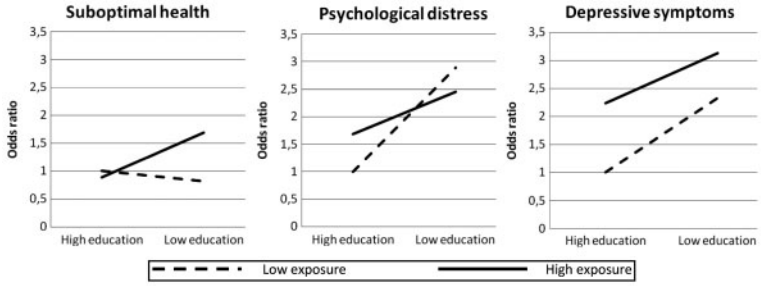

Figure 2 Graphic presentation of possible interaction between education and exposure to temporary employment for suboptimal health, psychological distress and depressive symptoms as outcomes (odds ratios)

temporarily employed from age 30 to age 42 years, but a decrease in depressive symptoms in both the groups. Bivariate and multivariate logistic regression analyses for these three health outcomes were performed in relation to the variable labour market position between age 30 and 42 years and education at age 42 years, after controlling for sex and health-related selection.

The OR for all the three health outcomes—self-rated suboptimal health, psychological distress and depressive symptoms—was significantly higher among those in temporary employment compared with the group with permanent employment (Model 1). Besides, for psychological distress and depressive symptoms, the OR remained significant in the full model. For self-rated health, the OR turned insignificant after controlling for health-related selection. Low education was almost significantly related to self-rated health in the bivariate model as well as after controlling for sex. In all other analyses, the OR for the health outcomes was not significantly related to low education, even though the OR was >1 in most of the models. The ORs for low education increased in Model 2 compared with Model 1, which indicates that sex was of importance for the relation between education and health status.

Possible interactions were assessed with additive interaction analyses[17] in multivariate logistic regression analysis (see table 2) for the combined variable labour market position between age 30 and 42 years and education.

For suboptimal self-rated health, we found significant OR in relation to the low education–high exposure group. The impact of temporary employment on self-rated health is bigger among low educated (OR 1.69 vs. 0.82, $P = 0.01$) than among high educated (OR 0.89 vs. 1, $P = 0.62$). Thus, there seems to be an additive synergistic interaction between education and temporary employment for this health outcome.

The OR for psychological distress was significantly higher among all three groups (high education–high exposure, low education–low exposure, low education–high exposure) compared with the high education–low exposure group. The impact of temporary employment on psychological distress was bigger among high educated (1.68 vs. 1 $P = 0.04$), while no impact was seen among the low educated (2.45 vs. 2.89 $P = 0.54$).

The OR for depressive symptoms was significantly higher among the low education–high exposure group, compared with the high education–low exposure group. The impact of temporary employment on depressive symptoms was greater among high educated (2.24 vs. 1, $P = 0.08$) compared with the low educated (3.13 vs. 2.33, $P = 0.54$).

RERI with 95% CI was calculated for each outcome. The results indicate an additive synergistic interaction for suboptimal self-rated health, an additive antagonistic interaction for psychological distress and no interaction for depressive symptoms.

Figure 2 gives a graphic illustration of the different interaction patterns between education and exposure to temporary employment for the three different outcomes.

The same pattern is found as for RERI. Regarding suboptimal self-rated health there was a slight synergistic deviation from an additive effect, while regarding psychological distress we have a clear antagonistic interaction. When it comes to depressive symptoms the lines are rather parallel and thus give a weak indication of deviation from additivity.

Discussion

On the results

Our hypothesis regarding worse health impact of temporary employment among low educated was partly confirmed. In the full multivariate logistic regression analyses, a synergistic additive interaction effect was found for the group with low education and high exposure to temporary employment in relation to suboptimal self-rated health. The hypothesis was not confirmed for psychological distress or for depressive symptoms. In fact, temporary employment seemed to be worse for high- than for low educated in relation to psychological distress.

A possible explanation for the different results depending on health outcome could be that self-rated health is a much broader measure of health status than psychological distress and depressive symptom, and thus captures many more dimensions of health status including perceptions of fitness and health-related lifestyle.[15] Other explanations could be the nature of work tasks as well as the work environment (e.g. that high-educated temporarily employed may have more demanding and more stressful work than low educated) or recall bias (that high educated are more willing to admit to psychological distress than low educated). However, report bias seems to be less probable.

Our study is one of the first to analyse the importance of education for the relation between temporary employment and health status. We know of no other studies that have analysed the importance of education for the health effects of temporary employment. Earlier research tends to be concerned with temporary employees with relatively high education.[2,3,20] The studies based on population level samples have treated education, as well as socio-economic position in general, as a background variable[21–24] or even disregarded it.[25] A Finnish cross-sectional study[26] did not find any differences in the associations between temporary employment and self-rated health or depression between public sector (more educated) and private sector (less educated) employees.

Statistics show that temporary employment is more common among high- than low-educated people in European countries with a high proportion of temporary employment (>10%), for example, in Sweden, Finland, Spain and Germany.[2] On the other hand, temporary employment is more common among less educated people in countries with a

low proportion of temporary employment (<10%), for example, in Belgium and the USA.[2] Therefore, comparative studies of the associations between temporary employment and health status may produce mixed results if the analyses do not take socio-economic position into account.

Our results also showed that there were associations between exposure to temporary employment during a 12-year period and poor health status, even after control for health-related selection as well as for education. There are few longitudinal studies within the field and thus our results provide support for the growing field of research on the importance of temporary employment for the health of the population.[2,3]

On the methods

The main strength of this study is the long follow-up of a cohort of school leavers in combination with the extraordinarily high response rate of the study. Thus, the kinds of people who are non-responders in other studies have participated to a great extent in our study. Earlier research has shown that the non-responders tend to have worse health behaviour than the responders.[27] Great effort was devoted to tracing all participants as well as keeping them informed about the study in order to increase their willingness to participate.

The main limitation of the study was the relatively small cohort, which made it impossible to analyse different forms of temporary employment in more detail or to make separate analyses for men and women. However, we have constructed variables for the multivariate analyses in order to get enough power for the analyses. For example, the cut-off points were chosen at the 75th percentile in order to give both a highly exposed group and enough power in the analyses.

There are several different measures of socio-economic position, which all measure aspects of the underlying socio-economic stratification.[28] Level of education is an important and often used marker of socio-economic position, as information about education is easily available for everyone independent of labour market position, but also because health-related selection is concluded to be less pronounced when education is used as compared with other measures.[29] Also, high level of education is predictive of better jobs (in relation to income, work environment and working conditions). However, there are also limitations to the measure.[29] In spite of the same level of education, women get lower financial return than men. This limitation is of minor importance in this study, in which—due to low power—we did not distinguish between men and women. Also, education has a different meaning in different contexts (e.g. due to various degrees of prestigious qualifications) which is also of minor importance in our rather homogeneous sample.

We did not include analyses of possible mechanisms (such as psychosocial work conditions or physical strain, low wages) in this article, as that would have led to over-adjustment, i.e. education correlates strongly with working conditions. However, the role of working conditions as a possible mediator of the health effects of temporary employment is an important topic for future research. Besides, there is a need for analysis of the importance of gender for the relationship between temporary employment and education in relation to the health outcomes.

Conclusion

Our hypothesis regarding worse health effects of temporary employment among low educated was partly confirmed. Our results indicate the need to analyse temporary employment from a more heterogeneous perspective as well as in relation to different health outcomes.

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Conflicts of interest: None declared.

Key points

- This is one of the first studies that have analysed the importance of education for the health effects of temporary employment.
- Low education in combination with high exposure to temporary employment was related to poor self-rated health.
- Temporary employees need to be regarded as a heterogeneous group.
- Public health research needs to be more contextualised.

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