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The association of precarious employment to the unmet need for healthcare in Sweden: a prospective cohort study with multiple follow- ups

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ABSTRACT

Introduction: Access to healthcare is a critical determinant of health and central to Swedish public health policy. Sweden, like many other countries has seen a rise in precarious employment and there has been substantial research into the negative health effects associated with it. In accordance with vertical equality in health care, people exposed to precarious employment should consequently have greater access to health care and resources. The aim of the present study is to investigate the association between precarious employment and unmet needs for health care in Scania, Sweden.

Methods: Questionnaires were sent out to a random sample of residents of Scania in 1999/2000 with follow-ups in 2005 and 2010. Unmet need for health care was self-assessed. Precarious employment was assessed through questions on present employment, previous employment, temporary vs. permanent employment and perceived job insecurity. Additional measures included age, gender, marital status, education, born in Sweden, socioeconomic index, social participation, economic vulnerability and self-rated health. The current cohort is made up of respondents age 18-54 years at baseline who answered the questions on precarious employment in 1999/2000 and 2005 and to the unmet need for health care in 2010 (n=3.604).

Results: Exposure to precarious employment in 1999/2000 and/or 2005 is associated with unmet need for health care in 2010 (OR 1,78 CI 95% 1,51-2,11). When adjusting for education, social participation, economic vulnerability and self-rated health this association remained with an odds ratio of 1,38 (CI 95% 1,15-1,65). Both economic vulnerability and self-rated health also had synergistic effects.

Conclusion: Precarious employment leads to an unmet need for health care and this association is strongly linked to vulnerability. This is contrary to Swedish public health policy and the principle of vertical equality and needs to be addressed to mitigate the effects of the modern labour market on health.

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INTRODUCTION

Background

Precarious Employment

Globalisation and neoliberal economic policies including market focus on privatisation have led to an increase in precarious employment relations both globally and locally (1-3).

Precarious employment refers to a weakening of standard employment conditions, which have been described as “secure, full-time, year-round, well compensated and socially protected” work (1), and has been encompassed by a variety of terms including “flexible”, “temporary”, “contingent”, “casual”, “fixed-term”, “atypical” and “non-standard” work. It is characterised by low incomes, short working hours and poor working conditions (3), high job insecurity (2), lack of training and a lack occupational health and safety (OHS) (1).

This increase in employment flexibility has enabled companies and organisations to increase profitability at the expense of employee security (2) through the transference of risk from the employer to the employee. In the core-periphery model of labour market relations it is described as a continuum with permanent and secure employment at the core and increasing degrees of precarity at the periphery (4, 5). This diversity of employment relationships has called into question the usefulness traditional view of employment as a binary construct with employed vs unemployed, when investigating employment as a social determinant of health. Precarious employment is considered as distinct from the cyclical unemployment that has occurred historically (3) .

As Guy Standing describes in his book, “The Precariat”:

“This is not just a matter of having insecure employment, of being in jobs of limited duration and with minimal labour protection, although all this is widespread. It is being in a status that offers no sense of career, no sense of secure occupational identity and few, if any, entitlements to the state and enterprise benefits that several generations of those who saw themselves as belonging to the industrial proletariat or the salariat had come to expect as their due” (6).

Given this rise in precarious employment as well as the interest in social determinants of health there has been an increase in research on the impact of precarious employment on health. Some

employment conditions that have been associated to poor health outcomes include organisational restructuring and downsizing (1), temporary employment (1, 7), perceived job insecurity (1, 8, 9), work history (2), and unemployment at a young age (10). In fact, most research points to the critical aspect of employment for health is job insecurity (7), (8), (9). Job insecurity has been found to be more important for health than whether employment is temporary or permanent (7) and the health effects are worse if the insecurity is persistent as opposed to episodic. The effects of job insecurity have been shown to be stronger than actual unemployment or job loss (9). Insecurity is a key characteristic of precarious employment.

Precairous employment, Health and Health Inequality

There have been many studies that have looked at different ways the precarious employment, and unemployment, have impacted health and health care utilisation in different ways.

Unemployment in particular has been associated with worse health in general and poor mental health in particular as well as to a higher unmet need for health care (11). It has been associated with both poor self-rated health (9, 12) and an increased use of health services (12).

Longitudinal studies have shown that youth unemployment increases the risk of poor mental health (3), later sickness absence, disability and even death (10).

Some research, however, has pointed to that precarious employment in Scandinavian welfare states may not be associated with negative health outcomes as compared to permanent employment due to the mediating effects of social protection and economic vulnerability (1) which may act as a buffer (3, 8). It could do this by a) improving the stability of household income, b) by redistributing wealth within the population and reducing income inequality, and c) by lowering the stress associated with job insecurity (8).

Swedish public health policy is based on the principle of good health on equal terms for the entire population regardless of age, gender, sexual orientation, race, ethnicity, disability, socioeconomic status, religion, or other distinction (13). Sweden has universal health insurance which is 94% publicly financed and the 6% which is not covers alternative medical treatments or non-medically motivated plastic surgery (14). Despite universal health insurance the health care system does involve co-payments. In Scania these are SEK 200 for primary care, SEK 300 for hospital care or specialist care (unless by referral where it is SEK 100), and SEK 400 for emergency care. Co-payment ceilings are set at SEK 1.100 per year (15). Health care services are administered and delivered by County Councils through both public and private service

delivery providers. However, despite this strong egalitarian tradition inequalities in health exist and are increasing (16, 17).

In addition, Scandinavian welfare is not constant (3) and Sweden in particular has undergone significant health sector and social welfare reforms between 2006 and 2010 resulting in a combination of stricter eligibility criteria and lower compensation which may have further weakened this buffering effect (18).

Unmet needs for health care

Access to health care services is a key determinant of health (14), (19) and a critical component in health equality. Health care equality can be envisioned in two ways: 1) vertical equality which refers to more resources being used for those in most need, and 2) horizontal equality which refers to similar cases being treated in the same way (5, 16), both of which are in accordance with Swedish public health policy. However, both constructs of health equality presupposes health care access and unmet need for health care is an important indicator for health care access (20).

Unmet needs for health care refers to not accessing health care services despite there being a perceived need for them. Despite Sweden's inclusive public health policy substantial differences in unmet need for healthcare have been found including among socioeconomically disadvantaged groups and among those who have experienced perceived discrimination (14), it has been associated with age, not being born in Sweden (21), lower education, being single, having low emotional support, low instrumental support (11), being economically vulnerable, being unemployed or on disability pension (16) as well as with both lack of confidence in and availability of health care services (22).

Rationale

Access to healthcare is a critical determinant of health and central to both Swedish public health policy and an important World Health Organisation (WHO) objective (23). Sweden, like many other countries has seen a rise in precarious employment and there has been substantial research into the negative health effects associated with it. In accordance with vertical equality in health care, people exposed to precarious employment should have greater access to health care and resources. However, from the research into unmet needs of health care it would seem that it is

the more disadvantaged groups that are likely to be represented in this category and this may include those in precarious employment.

Study Aim and Research Questions:

The aim of this study was to investigate whether there is an association between precarious employment and unmet need for healthcare in Scania, Sweden.

- Hypothesis: There is an association between precarious employment and unmet need for healthcare in Scania
- Null hypothesis: there is no association between precarious employment and unmet needs for healthcare in Scania.

A secondary objective was to investigate the association of different socio-demographic and socioeconomic factors to unmet needs for health care in Scania, Sweden as discussed in previous studies cited above (14), (16, 21), (11), (22).

METHODS

Study Population:

The study population consists of the Scania Public Health Cohort established in 1999/2000 with follow ups in 2005 and 2010. A total of 25,000 questionnaires were sent out to a random sample of people resident in Scania, Sweden, aged 18-80 years. A total of 13,604 were returned (response rate of 54,4%). Respondents were followed up again in 2005 and 2010. For a more detailed description of the methodology please refer to Carlsson et al.(24) Respondents included in the current study sample included those aged 18-54 years at baseline and who responded to the questions on precarious employment in 1999/2000 and 2005 and to the unmet need for health care in the past three months in 2010 (n=3604). The age limit of 54 years at baseline was selected since the exposure of interest is precarious employment and respondents aged over 54 years would be at retirement age at the follow up in 2010. Please see below for a description of this and other variables of interest to this study.

Ethical Considerations

The research ethics committee for Lund University approved of this study (1999-99; 2005-471; and 2010-392).

An informed consent letter was sent with each version of the questionnaire detailing the purpose of the study, how the data will be used, and the risks and benefits of participation. Contact information for the researchers was provided to participants so that any questions they may have could be addressed as well as providing them with the possibility of accessing any data on themselves. This included the option to withdraw from the study at any time as well as having one's data deleted from the data set. Completion and return of the rather lengthy questionnaire by post was taken as consent.

Privacy and confidentiality were assured through the removal of any personal identification data prior to data analysis, as well as the destruction of the completed questionnaire. Studies based on the data only report aggregate data preventing the identification of individuals. Data is stored under lock and key to prevent access by unauthorised persons.

Through these actions this study adheres to the key ethical principles of public health research of benevolence and non-maleficence, ensuring that the potential benefits from the study outweigh the potential harms. As this is a large-scale study involving a postal questionnaire sent to a random sample of adults living in Scania between 1999/2000 and 2010 covering a wide variety of health related variables, the risk for harm is rather small while the potential benefit for public health planning in the region is substantial. Responsibilities to the community being studied will be met through ensuring that all studies using the data will adhere to public health research standards and the results of which will be reported through the use of academic publications as well as to inform health promotion and health service provision efforts in Scania.

Outcome Variable:

The outcome being measured is the unmet need for healthcare which was measured by asking respondents if they have perceived themselves as requiring health care but have refrained from seeking it within the last three months. Response alternatives were “yes, several times”, “yes, once” and “no”. These responses were recoded into a binary variable combining those responding “yes, several times” and “yes, once” into a single category “yes” indicating an unmet need for healthcare in the past three months and comparing them to those who responded “no” indicating no unmet need for healthcare in the past three months.

Exposure Variable:

The exposure of interest is precarious employment. A validated measure of precarious employment was not available at baseline however substantial research has discussed the health effects of different employment conditions including a) temporary or permanent employment; b) perceived job insecurity (1); and c) work history (2). In this study, four questions were asked to gather data on present employment, previous employment, temporary vs. permanent employment and perceived job insecurity. These were:

1. Which of the following applies best to you at the present moment? Response alternatives: a) do not work outside of the home, b) employed, c) pensioner (including disability pension, long-term sick leave, and old-age), d) student, e) unemployed.
2. If employed, what are the terms of your employment? Response alternatives: a) permanent, b) substitute, c) fixed term, d) on demand and e) other temporary employment.
3. Have you been involuntarily unemployed at any point during the past three years? Response alternatives: no or yes.

4. What risk do you perceive of becoming unemployed within the coming year? Response alternatives: a) high risk, b) moderate risk, c) low risk, d) no risk, e) I do not want to work a year from now.

Students, those on pensions and those who answered they did not wish to work a year from now were excluded as the focus of this research is on employment.

Based on the data collected from these questions a dichotomous variable was created – non-precarious (NP) employment vs precarious employment (PE). NP was defined as those with i) permanent work and no or low perceived risk of unemployment within the coming year and ii) those with contingent work but no perceived risk of unemployment within the coming year. PE was defined as all others with contingent work, with previous unemployment, with moderate to high perceived risk of future unemployment, and all those currently unemployed.

As exposure was measured at two points (1999/2000 and 2005) a binary variable was developed defining the exposure to precarious employment. The categories used were 1) non-precarious (NP) defined as non-precarious at both baseline and 2005 and 2) precarious employment (PE) which was defined as anyone reporting precarious employment either in 1999/2000 or 2005 or both.

Other Variables

Additional variables included in the analysis were measured at baseline (1999/2000). These include socioeconomic index, social participation, economic vulnerability, self-rated health, as well as age, gender, marital status, education and born in Sweden.

Socioeconomic index for this research study is dichotomised by type of labour: non-manual vs. manual.

Social participation was assessed through asking: “Have you attended... *(13 different formal and informal social activities)* during the past year?”. Answering yes to 4 or less of these is categorised as low social participation, 5 or more is categorised as high social participation.

Economic vulnerability is assessed through two questions to assess difficulty in managing household finances. The first question read “How often in the past 12 months have you had

difficulties in paying your bills? Response alternatives: every month, approximately half the months of the year; maybe once; and never. The second question is: “In case of an emergency, would you be able to raise SEK 14,000 within a week? Response alternatives: yes, no. Respondents are categorised as economically vulnerable if they responded approximately half of the months of the year or more to the first question and no to the second question.

Self-rated health is assessed through a single question: “How do you rate your current health status?” Response alternatives: very good; good; fair, poor, very poor. Good health was categorised by responding either good or very good health. Poor health was categories as fair, poor and very poor responses (25).

A number of demographic variables measured at baseline were included in the analysis. Age was recorded at baseline (1999/2000) and ranged from 18 years to 54 years. Gender with response alternatives male or female. Marital status assessed through 4 response alternatives: a) married/cohabiting, b) unmarried, c) divorced, or d) widowed. These responses were recoded into a binary variable with married/cohabiting vs not married/cohabiting. Educational level was measured using the ISCED-instrument. The question asked was: “What is your highest educational attainment?”. Ten response alternatives were provided: a) primary school education (years 1-6); b) middle school education (years 7-9); c) high school education – less than 2 years completed; d) high school education – 2 year programme completed; e) high school education – 3 year programme completed; f) post high school education – programmes shorter than 2 years (e.g. high school equivalency courses; g) post high school education – programmes between 2-2,5 years long; h) university Bachelors degree or equivalent; i) university Masters degree or equivalent; j) university Doctoral degree or equivalent. These responses were recoded into a binary variable: 13 years of education or more (more than high school education completed) vs 12 years of education or less (high school education or less). Lastly, respondents’ immigrant status was also assessed through a proxy of being born in Sweden – response alternatives were yes or no.

Statistical Analysis

The distribution of unmet need for healthcare in the past three months vs. no unmet need for healthcare in the past three months was calculated by age, gender, marital status, education, born in Sweden, socioeconomic index, social participation, economic vulnerability, and self-rated health and precarious employment (Table 1). All of these variables were measured at baseline

while precarious employment was measured at baseline and in 2005 (principle exposure) and unmet need for healthcare in the past 3 months (outcome) was measured in 2010.

First, the association between precarious employment and potential confounders to unmet need for healthcare in the past three months was calculated individually using logistic regressions to generate Odds Ratios (ORs) with 95% confidence intervals (Table 2). The variables which were significantly associated to the outcome, unmet need for healthcare in the past 3 months, were then included step-wise into the model for the association between precarious employment and unmet need for healthcare as potential confounders (Table 3). These include education, born in Sweden, social participation, economic vulnerability and self-rated health. Socioeconomic Index was excluded from the model even though it showed a small significant effect as there was a very high non-response rate which could bias the findings and it was considered that there would be significant overlap with education. The model was adjusted for age.

Both economic vulnerability and self-rated health were tested for effect modification given their strong association to unmet need for health care in the past three months (Table 4).

Dummy variables were created for economic vulnerability by identifying those with no precarious employment no economic vulnerability (0+0) and comparing them to those exposed to precarious employment but no economic vulnerability (1+0), no precarious employment but economic vulnerability (0+1), and both precarious employment and economic vulnerability (1+1). The same was done for self-rated health. Each dummy variable was then tested for association to unmet need for healthcare in the past 3 months in 2010 using independent binary logistic regressions.

The first test for effect modification was to assess the additive effects by calculating the difference in OR of those exposed economic vulnerability but not precarious employment and those exposed to precarious employment and not economic vulnerability and comparing them to the OR of those exposed to both precarious employment and economic vulnerability. Effect modification is thought to take place of the OR of those exposed to both is greater than the ORs of those exposed to one or the other as described in the equation below:

$$OR_{(1+1)} > (OR_{(1+0)} - 1) + (OR_{(0+1)} - 1) + 1$$

Once the additive effect was established a test for synergistic effect was carried out using the algorithm below (26):

$$SI = \frac{(OR_{(1+1)} - 1)}{(OR_{(1+0)} - 1) + (OR_{(0+1)} - 1)}$$

Where:

SI is the Synergy Index

OR(1+1) is the odds ratio of the dummy variable exposed to both variables

OR(1+0) is the odds ratio of the dummy variable exposed to one variable

OR(0+1) is the odds ratio of the dummy variable exposed to the other variable

RESULTS

Distribution

Of the original 8.206 persons who returned the postal questionnaire in 1999/2000, 2005 and 2010 a total of 3.604 were aged between 18-54 years at baseline and responded to the questions of precarious employment in 1999/2000 and 2005 and to the question on unmet need for healthcare in the past three months in 2010 and were subsequently included in the current study (see Table 1). There were 1.495 males and 2.109 females. Majority of the sample was married or cohabiting (n=2.652), born in Sweden (n=3.257), score highly on social participation (n=3.218), are not economically vulnerable (n=3.331), have good self-rated health (n=2.795) and are not precariously employed (n=2.435 in 1999/2000 and n=2.634 in 2005). In terms of non-respondents, there was a high rate of non-response to questions relating to socioeconomic index (n=1.791).

The highest prevalence of unmet need was in the age group 35-44 years with 22,2% while the lowest was in the age group 45-54 years with 17,4%. Females had a higher rate of unmet need at 20,7% as compared to 19,1% for males. People who were married or cohabiting reported a 19,7% rate of unmet health care needs in the past three months as compared to 20,4% in those who are single. People with 12 years or less of education reported a higher rate of unmet need at 22,5% as compared to those with 13 years or more at 17,2%. Those who were not born in Sweden reported a 33% prevalence of unmet need while those who were born in Sweden reported a 18,7% prevalence. In terms of socioeconomic index, those who had manual jobs reported at 20,2% unmet need as compared to 16,9% in those who had non-manual jobs. Those with low social participation had a 28,5% prevalence of unmet need as compared to 19% in those reporting high social participations. Respondents that are categorised as being economically vulnerable had the highest prevalence of unmet need for health care in the past 3 months at 41,1% as compared to 18,4% in those that were not. Poor self-rated health also had a high rate of unmet need at 34,4% as compared to 15,8% among those with good self-rated health. Finally, reporting precarious employment had a higher prevalence of unmet need for health care in both 1999/2000 and 2005 at 26,5% and 26,7% respectively as compared to 16,9% (1999/2000) and 17,6% (2005) in those who were not precariously employed.

Bivariate Analyses

Precarious employment, as measured at baseline was significantly associated to unmet need for health care in the past 3 months measured in 2010 with a crude odds ratio of 1,77 which means that the odds of having an unmet need for health care is 1,77 times higher among those who are exposed to precarious employment in 1999/2000 than those who are not. Education (OR=1,39), born in Sweden (OR=2,15), socioeconomic index (OR=1,24), social participation (OR=1,7), economic vulnerability (OR=3,09), and self-rated health (OR=2,79) as measured at baseline were also all significantly associated with an unmet need for health care in the past 3 months measured in 2010 (Table 2). The demographic variables tested for association to the outcome, age, gender and marital status, were not significantly associated to the outcome.

Multivariate Analysis

The age adjusted odds ratio of precarious employment in either 1999/2000 or 2005 or both to unmet need for health care in 2010 is 1,78 (CI 1,51-2,11). After adjusting for education, the OR decreases slightly to 1,73 (CI 1,46-2,04). Adding born in Sweden to this model decreased the association even further to 1,63 (CI 1,37-1,93). Social participation also had a weak effect to the association bringing the OR to 1,6 (CI 1,35-1,91). Adding economic vulnerability decreased the association to OR = 1,51. Finally, after adjusting for all these covariates as well as self-rated health, the OR for precarious employment is still significant at 1,38 (CI 1,15-1,65) meaning that people exposed to precarious employment in either 1999/2000 and/or 2005 have 1,38 times higher odds of having an unmet need for health care in 2010 after controlling for the effects of age, education, born in Sweden, social participation, economic vulnerability and self-rated health (see Table 3).

None of the variables tested were found to be confounders as they did not change the strength of the association between precarious employment and unmet need for health care by 10%.

Effect Modification

Given the strong association of both economic vulnerability (crude OR=3,09) and self-rated health (crude OR=2,79) to unmet need for healthcare (see table 2), both were tested as potential effect modifiers to the association between precarious employment and the unmet need for healthcare in the past three months (Table 4).

Respondents reporting both precarious employment and economic vulnerability had 4,52 higher odds of reporting an unmet need for healthcare in 2010 than those reporting neither. The excess risk associated with the exposure to both variables is 1,62.

Self-rated health also demonstrated an interaction effect with precarious employment and poor health resulting in an odds ratio of 4,2 and a synergy index of 1,23.

DISCUSSION

Principle Findings

The results of this study clearly support the acceptance of the hypothesis that exposure to precarious employment in 1999/2000 and/or 2005 is significantly associated to an unmet need for health care in the past three months in 2010 in Scania, Sweden and this association is mediated by a number of socio-economic variables including education, born in Sweden, social participation, economic vulnerability and self-rated health.

The experience of unmet need for health care in 2010 did not seem to be associated with demographic variables such as age, gender, or marital status. Instead, the importance of socio-economic variables for unmet need were clearly highlighted in this study (Table 2). People who had less education, who were not born in Sweden, who were engaged in manual labour, who had low social participation, who were economically vulnerable, who had poor self-rated health, or who were precariously employed in 1999/2000 had higher risk of unmet need for healthcare in 2010. In fact, this supports previous research that indicates that it is the more vulnerable persons in society that are likely to experience unmet needs for health care (16, 20, 22, 27).

This study found that being exposed to precarious employment in 1999/2000 and/or 2005 is significantly associated with experiencing perceived unmet need for health care in the past three months in 2010 among people aged 18-54 years in Scania, Sweden (Table 3). The odds ratio for this association (adjusted for age), is 1,78 (CI 95% 1,51-2,11) meaning that people who have been exposed to precarious employment have a 1,78 times greater risk for experiencing an unmet need for health care in the past three months than people who have not been exposed to precarious employment. After adjusting for education, born in Sweden, social participation, economic vulnerability and self-rated health the odds of having an unmet need for health care in 2010 after exposure to precarious employment in 1999/2000 and/or 2005 is 1,38 times higher than those who were not exposed to precarious employment.

In addition to the mediation effects, economic vulnerability and self-rated health were both independently found to strengthen the relationships between precarious employment in

1999/2000 and/or 2005 and unmet need for health care in the past 3 months in 2010. People exposed to be precarious employment and economic vulnerability had 4,52 times higher odds (CI 95% 3,25-6,28) of unmet need for health care in 2010 and the excess risk associated with exposure to both is 1,62 as compared to exposure to either one or the other. As for self-rated health, persons exposed to both precarious employment and poor health had 4,2 times higher odds of unmet need of healthcare than those exposed to neither. The interaction effect accounted for 1,23 excess risk.

Findings in relation to previous research

These findings support previous research that highlight the association of precarious employment to negative health impacts including an unmet need for health care. This even in Scandinavian welfare states which had, in some studies, been found to have no difference in health impacts between temporary/flexible employees and their permanent counterparts (1). One factor which may have impacted this finding is the global financial crisis that took place in 2008 which has increased precarious employment and unemployment all over the world including in Sweden (1). In this study, data on precarious employment was collected in 1999/2000 and again in 2005. People who were categorised as non-precarious at those two points in time may have become precarious between 2008 and 2010 when the outcome was measured. As a result of this potential misclassification, some persons who were categorised as non-precarious in 1999/2000 and 2005 were more likely to report an unmet need for health care in 2010. This too would create a bias towards the null hypothesis meaning that the association between precarious employment and the unmet need for health care would in fact be stronger than that reported in this study.

Another critical occurrence which may have decreased the buffering effect of the Swedish welfare system has been the reform of social insurance system between 2006-2010 which has resulted in lower compensation levels and stricter eligibility criteria (18). It has included a time limit for persons on sickness benefits, it has raised fees for membership in unemployment insurance and it has instated an working tax credit (18). These policies have the dual effect of reclassifying people previously eligible for disability pension or sick leave benefits into the category of precariously employed or unemployed while simultaneously increasing their economic vulnerability. As the health outcome, unmet need for health care was measure in 2010, this change could mean that persons who were previously categorised

as non-precarious in 1999/2000 and 2005 were in reality precariously employed or unemployed in 2010. Again, this would result in a bias towards the null hypothesis and that the association between precarious employment and unmet need for health care being stronger in reality than that which has been reported here.

As such, this study supports the now robust association between precarious employment and health and different models have been proposed in order to explain the mechanisms behind this relationship, and which are supported by the findings of this study to different degrees.

The models of economic deprivation theorise that unemployed persons, or in the case of this study, precariously employed persons, have access to less income and therefore have worse precursors for health (28) including access to health care services. This is supported in the current findings by the important role of economic vulnerability in the association of precarious employment and the unmet need for health care and is in line with previous research (14, 16, 19, 29). However, this model falls a little short as the association remains even after adjusting for economic vulnerability. In addition, it fails to explain its role not only as a mediator but as an effect modifier, in which exposure to both precarious employment and economic vulnerability has a synergistic effect on the odds of having an unmet need for health care. It also fails to account for the mediator effects of the other socioeconomic variables found to be significant to the association.

The models of social support similarly posit that social support is critical to the association between unemployment and health. According to these models, social support is directly related to good health and well-being, while at the same time providing a buffering effect to the negative impacts of unemployment on health (28). These models are partially supported through the results of this study through the importance of social participation as a mediator of the association between precarious employment and the unmet need for healthcare, but again are inadequate to explain all the variance between precarious employment and the unmet need for health care as found in this study.

One possibility then to explain the rest of the association are the stress models which theorise that job loss is an acute stressor and stress in turn causes ill health and disease and that social support is a mediator of this association (28). In this study it was thought that the stress

caused by job loss can be extended to the stress associated with job insecurity (7-9) and which is a defining characteristic of precarious employment. Stress, according to these models, is thought to be a direct cause of the negative health outcomes (28). The results of this study support the role social support as a buffer as described above in the case of social participation. Also, it could also explain the important role of some of the other socioeconomic mediators such a born in Sweden, in which adapting to a new country, culture and community could also be considered a stressor. Having lower education in a community where the general education rates are higher and where more jobs require higher education levels may also be considered a stressor. In addition, it could also provide an explanation as to why both economic vulnerability and self-rated health have both a mediator and synergistic effect on the association. In accordance with these models, and as with the variables discussed above, both economic vulnerability and poor self-rated health are stressors in addition to the stress caused by job insecurity. This combination of stressor could lead to both direct negative health impacts as well as interactive effects. In terms of economic vulnerability, people who are both precariously employed and economically vulnerable may not be able to take time off work when sick or otherwise in need of health care due to the associated loss of income but also due to the insecurity of their employment and potential for losing their jobs. As such they would be at even higher risk for unmet need for health care. In the case of poor self-rated health, poor health directly causes an increase in the need for health care and while precarious employment may limit the ability to access health care, either for fear of losing one's job by taking time off or working hours that are incompatible with primary health care opening hours. Also, previous research indicates that self-rated health is not consistently related to unmet need for healthcare. Though poor health is a precursor for a need for health care, not all causes of poor health require health care services (27). In addition research has shown that people suffering from long-standing illnesses are more likely to refrain from care than those that do not (16). This can be linked to the assumption that people in poorer health may have higher health care utilisation, and higher utilisation can in turn lead to greater likelihood of unmet needs (30).

Public Health Implications

These findings have important public health implications. Firstly, it is clear that precarious employment is associated both to poor health and to an unmet need for health care. The rise of precarious employment globally and locally is likely to aggravate the health status of our

communities. Secondly, the principle of vertical equality in the delivery of health care in Sweden is clearly not being met. It is the most vulnerable people in society that are more likely to have unmet needs for health care. Access to health care services is a key determinant of health and this trend could lead to an aggravation in the already existing inequalities in health. Lastly, it is clear that socioeconomic factors impact the association between employment and health and as such social welfare has the potential to act as a buffer.

Methodological Considerations

The key strengths of this study are that it is a randomly selected, population-based, prospective cohort study that adjusts for many potential confounders. It follows the same individuals collecting comprehensive health-related data at different points in time over the space of a decade.

Though this is a prospective cohort study, causation can not necessarily be inferred as people who had unmet need for health care at baseline were not removed from the study population. One reason for this is that unmet need for health care, defined as not accessing health care services in the past 3 months, can be perceived as a behaviour, rather than an event or state and as such cannot be appropriately selected for at baseline. Given the longitudinal prospective data collection as well as the strongly significant results causality can be assumed and this is in line with previous research (28).

On potential short-coming of this study is the lack of data and responses from ethnic minorities (24). Approximately 20% of the Swedish population has an immigrant background (14) and Sweden is a multi-ethnic society (21), as such it is important to engage ethnic minorities to get accurate and representative data on population health. Previous research has found that immigrants in Sweden have higher rates of unemployment (10) and higher rates of morbidity regardless of how it is measured (21). In addition, perceived discrimination has been found to be important in terms of unmet needs for health care (14) and this is relevant not only to discrimination based on ethnicity but also gender, disability, sexual orientation and gender identity. As being born outside of Sweden is a strong predictor of both unmet need for health care as well as of being precariously employed, the lack of ethnic minorities may cause a bias towards the null hypothesis meaning that the association is in reality

stronger than what has been found and reported here and as such should not impact the validity of the association.

Another potential bias is in the selection of the cohort. There were a total of 5244 respondents to the question on unmet need for health care that had been followed up from 1999/2000, 2005 and 2010. Of these 5244 only 3604 also responded to the questions on precarious employment in 1999/2000 and again in 2005. The non-response rate was 950 in 1999/2000 and 1.103 in 2005. This high non-response rate was also found for the question on socio-economic index. Despite being significantly associated to the outcome in the bivariate analysis, socio-economic index was not included in the multivariate analysis due to the high non-response rate (n=776) and the consequent potential for bias. In addition, it is thought to be captured adequately by the variable on educational attainment. The low response rate to both the questions on precarious employment and socioeconomic index could indicate a lower response rate among those that are precariously employed as well as those in lower socio-economic categories as has been found in previous studies (3), (14). This potential selection bias again would result in an under-estimation of the strength of association between precarious employment and the unmet need for health care and hence not impact the validity of these findings.

Precarious Employment

A validated measure of precarious employment was not available at baseline, such as EPRES, the employment precariousness validated construct. EPRES measures precarious employment along four dimensions – temporariness, powerlessness, loss of wages, and lack of rights (1) in contrast to the measure used in this study which looks at current employment status, temporariness, previous unemployment and employment insecurity. EPRES also allows an analysis of dose-response effect – i.e. increased health effects of higher degrees of precarity and enables an analysis of the cumulative effects of precarious employment (4) which is not possible in the current study. Lastly, it enables the analysis of employment as a continuum (1), (4) as opposed to the dichotomous construct used in this study. However, the measure used in this study has been used successfully in previous research (3) and has clearly been able to demonstrate the association of precarious employment and the unmet need for health care in this case.

There is also a danger of misclassification of precarious employment in this study. For one, there are those who are involved in flexible labour as a choice, particularly for women but also for men to an increasing extent, who chose to prioritise time with family (3) over stable, permanent employment. There is also the potential misclassification as discussed earlier due to the financial crisis in 2008 and the social welfare reform between 2006-2010.

Misclassifications of this kind would result in a bias towards the null hypothesis again results in a weaker association of precarious employment to unmet needs for health care than is the case in reality and as such do not threaten the validity of these findings.

Unlike EPRES, this study also included unemployed persons as part of the precariously employed category which could be contested. However, high mobility into and out of the unemployed category has been found in this population (3) and job insecurity has been found to be more critical for health than actual job loss (7-9). In addition, this extension has been used successfully in previous research (3).

Unmet need for health care

Unmet need for health care can be defined in a number of ways: 1) it can be the difference between health care services that are needed and those received; 2) it can be lack of sufficient or appropriate services; or 3) self-assessed unmet need, which is used in this study. Self-assessed need presumes that the patient is best placed to determine their own health status and needs as well as whether they have received appropriate services (30). However, is important to keep in mind that self-assessed unmet need may differ from professional evaluations of unmet need (14), which would be covered by the first two definitions. As this study looks at individuals who, for whatever reason, did not access health care services, professional evaluations are by definition not possible. Also, self-assessed unmet need is the most common measure used in public health research (30) and as such is deemed to be an appropriate measure for this study as well.

Self-rated health

Self-rated health is included as one of the covariates in the association of precarious employment to unmet needs of health care. As with the case of self-rated unmet need for health care, self-rated health is by definition a subjective measure and used as a proxy for burden of disease. This use has been validated in copious previous research (25).

In terms of the inclusion of self-rated health in the last step (Model 6) of the multivariate model, this may be an over-adjustment as the need for health care can be caused by having poor health. As such the relationship between precarious employment and unmet need for health care would be even stronger (OR 1,51 CI 95% 1,27-1,8).

Generalisability

In terms of the generalisability of these findings, these results are from Sweden, and despite the reforms has both strong health insurance and social welfare systems and as such this association is likely to be stronger in other settings.

CONCLUSION

The principle findings of this study are:

- Precarious employment leads to an unmet need for health care
- This association is mediated by socioeconomic factors including education, born in Sweden, social support, economic vulnerability and self-rated health

This study clearly finds that precarious employment leads to an unmet need for health care and that this association is closely linked to vulnerability. That it is the most vulnerable persons in society that are most affected both by precarious employment and that are consequently more likely to have an unmet need for health care - those that have lower levels of education, that are born outside of Sweden, that have lower social participation, are economically vulnerable, and in poor health. This is contrary to Swedish Public Health Policy which is based on the principle of vertical equality in which resources should be distributed only in accordance with need. If the most vulnerable are not even accessing health care services, this is clearly not being met and it looks like this trend is likely to continue or accelerate. In 2010 Sweden underwent a national health care act change allowing health care users choice of health care providers and wells as freedom of establishment for primary health care providers (30). Today 40% of primary health care is provided by private providers and though early research shows that after adjusting for need this reform is mostly beneficial to persons who are already well off (31) which is likely to further increase health inequalities.

Further research could be undertaken to look more in depth at the causality of the association between precarious employment and the unmet need for health care. There has been some research in this area already with conflicting results highlighting different aspects such as discrimination (14), lack of confidence in the services (22), social capital (23) or economic vulnerability (16) many of which have been supported through the finding of this study. In addition, the development of a more comprehensive model would be helpful in order to provide a more holistic understanding of the association and possibly relevant interventions. For example, are there health benefitting aspects of work that can be strengthened in the case of precarious employment and how can these be supported?

With the continued rise of precarious employment and the consequent health impacts, including unmet need for health care, this more detailed and more nuanced understanding of the association is critical in order to be able to provide appropriate health care services but also health promotion interventions to mitigate the effects of the modern labour market on the Swedish population.

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TABLES

Table 1

Table 1. Distribution of unmet need for healthcare in the past 3 months in persons aged 18-54 stratified by age, gender, marital status, education, born in Sweden, socioeconomic index, social participation, economic vulnerability, self-rated health and precarious employment at baseline (1999/2000), unless otherwise specified, in the Scania public health cohort (n=3604).

Variable		No unmet need		Unmet need		Total	
		need	%	need	%		%
Age	18-24	293	81,8	65	18,2	358	9,9
	25-34	708	78,1	199	21,9	907	25,2
	35-44	838	77,8	239	22,2	1077	29,9
	45-54	1043	82,6	219	17,4	1262	35,0
	Total	2882	80,0	722	20,0	3604	100,0
Gender	Male	1209	80,9	286	19,1	1495	41,5
	Female	1673	79,3	436	20,7	2109	58,5
	Total	2882	80,0	722	20,0	3604	100,0
Married/ Cohabiting	Yes	2129	80,3	523	19,7	2652	74,4
	No	728	79,6	186	20,4	914	25,6
	Total	2857	80,1	709	19,9	3566	100,0
Education	13 years or more	1427	82,8	297	17,2	1724	48,4
	12 years or less	1425	77,5	413	22,5	1838	51,6
	Total	2852	80,1	710	19,9	3562	100,0
Born in Sweden	Yes	2649	81,3	608	18,7	3257	90,8
	No	221	67,0	109	33,0	330	9,2
	Total	2870	80,0	717	20,0	3587	100,0
Socioeconomic Index	Non-manual	1461	83,1	297	16,9	1758	62,2
	Manual	854	79,8	216	20,2	1070	37,8
	Total	2315	81,9	513	18,1	2828	100,0
Social Participation	High	2606	81,0	612	19,0	3218	89,3
	Low	276	71,5	110	28,5	386	10,7
	Total	2882	80,0	722	20,0	3604	100,0
Economic Vulnerability	No	2717	81,6	614	18,4	3331	93,5
	Yes	136	58,9	95	41,1	231	6,5
	Total	2853	80,1	709	19,9	3562	100,0
Self-rated Health	Good	2353	84,2	442	15,8	2795	77,8
	Poor	524	65,6	275	34,4	799	22,2
	Total	2877	80,1	717	19,9	3594	100,0
Precarious Employment 2000	Non-precarius	2023	83,1	412	16,9	2435	67,6
	Precarius	859	73,5	310	26,5	1169	32,4
	Total	2882	80,0	722	20,0	3604	100,0
Precarious Employment 2005	Non-precarius	2171	82,4	463	17,6	2634	73,1
	Precarius	711	73,3	259	26,7	970	26,9
	Total	2882	80,0	722	20,0	3604	100,0

Table 2

Table 1. Association (ORs) of age, gender, marital status, education, born in Sweden, socioeconomic index, social participation, economic vulnerability, self-rated health and precarious employment measured at baseline (1999/2000), to unmet need for health care in 2010 amongst respondents aged 18-54 in Scania, Sweden.

Exposure		N	OR	CI (95%)
Age	18-24	358	1 (ref)	
	25-34	907	1,27	0,93-1,73
	35-44	1077	1,29	0,95-1,75
	45-54	1262	0,95	0,7-1,29
Gender	Male	1495	1 (ref)	
	Female	2109	1,1	0,93-1,3
Married/cohabiting	Yes	2652	1 (ref)	
	No	914	1,04	0,86-1,25
Education	13 years or more	1724	1 (ref)	
	12 years or less	1838	1,39	1,18-1,64
Born in Sweden	Yes	3257	1 (ref)	
	No	330	2,15	1,68-2,75
Socioeconomic Index	Non-manual	1758	1 (ref)	
	Manual	1070	1,24	1,02-1,51
Social Participation	High	3218	1 (ref)	
	Low	386	1,7	1,34-2,15
Economic vulnerability	No	3331	1 (ref)	
	Yes	231	3,09	2,35-4,08
Self-rated health	Good	2795	1 (ref)	
	Poor	799	2,79	2,34-3,34
Precarious Employment	No	2882	1 (ref)	
	Yes	722	1,77	1,5-2,1

Table 3

Table 2. Association (ORs with 95% confidence intervals) of precarious employment in 1999/2000 and 2005 to unmet need for health care in the past three months in 2010 with forward stepwise addition of potential confounding factors in 3,604 respondents from the Scania Public Health Cohort aged 18-54 years.

		Model 1 (age adjusted)	Model 2 = Model 1 + education	Model 3 = Model 2 + born in Sweden	Model 4 = Model 3 + social participation	Model 5 = Model 4 + economic vulnerability	Model 6 = Model 5 + self-rated health
Precarious employment 1999/2000 - 2005	Yes vs no	1,78 1,51-2,11	1,73 1,46-2,04	1,63 1,37-1,93	1,6 1,35-1,91	1,51 1,27-1,8	1,38 1,15-1,65
Education	> 13 years vs < 12 years		1,33 1,13-1,57	1,35 1,14-1,59	1,31 1,11-1,56	1,29 1,08-1,53	1,26 1,05-1,5
Born in Sweden	Yes vs no			1,9 1,47-2,46	1,81 1,39-2,36	1,63 1,25-2,14	1,58 1,2-2,01
Social participation	High vs low				1,31 1,01-1,7	1,26 0,97-1,64	1,17 0,9-1,53
Economic vulnerability	No vs yes					2,4 1,8-3,2	2,01 1,49-2,7
Self-rated health	Good vs poor						2,47 2,05-2,98

Table 4

Table 1. Odds ratios (ORs) and Synergy Indexes (SI) of unmet need for healthcare in the past three months in 2010 as a result of interaction between precarious employment in 1999/2000 and/or 2005 and economic vulnerability in 1999/2000 (n=3525) and self-rated health in 1999/2000 (n=3560) among 18-54 year olds in Scania, Sweden.

Variable	n	OR	CI (95%)	SI
Economic vulnerability	3 592			
Neither	1 986			
Precarious employment, no economic vulnerability	1 375	1,65	1,38-1,96	
No precarious employment, economic vulnerability	64	2,52	1,46-4,33	
Precarious employment and economic vulnerability	167	4,52	3,25-6,28	1,62
Self-rated Health	3 604			
No precarious employment and good health	1 687			
Precarious employment and good health	1 115	1,71	1,40-2,10	
No precarious employment and poor health	354	2,88	2,20-3,77	
Precarious employment and poor health	448	4,20	3,31-5,33	1,23

POPULAR SCIENCE SUMMARY

How you work can affect how you access health care

We have all seen that working conditions and working relationship between employers and employees are in flux. No longer are you expected to pick a career in secondary school and follow it through to retirement, often loyal to the same employer throughout. More and more people are involved in temporary, flexible and casual work, shifting through different employers and sometimes having multiple employers at the same time. This change can be thought of as liberating, allowing workers more freedom over their own time and labour but there is the downside in which this type of work associated with greater insecurity, a lack of health and safety, with lower opportunities for professional development and with lower incomes. It has also been linked to worse health and now even to a lack of access to health care despite universal health insurance in Sweden. Even worse is the fact that it is the more vulnerable people in society that have both insecure jobs and this lack of access to health care – those who have less schooling, who are immigrants, who are not involved in their communities, those who are poor, and those who are ill. It is these same people who are most likely to need health services. These effects are even strong for those who have flexible employment and poor health or flexible employment and financial insecurity – they are even more likely to not access health care when they need it. This relationship between work and health show that there are inequalities in health and that these are likely to grow as this form of work grows. We now have to look at this relationship more closely to see what we can do to improve the health of flexible workers and to make sure that they can get health care when they need it.