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Educational differences in psychological distress? Results from a population-based sample of men and women in Sweden in 2012

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11 **Educational differences in psychological distress? Results from a population-**
12 **based sample of men and women in Sweden in 2012**
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53 Keywords: Health inequalities, Psychological distress, Population surveys, Sweden
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Abstract

Background: Mental health problems are more frequent in socially disadvantaged groups, but the results vary between different studies, different populations and different measures of mental health. This paper investigated the association between educational level and psychological distress in Sweden.

Methods: The study population included 24,510 respondents aged 25-74 years who responded a survey questionnaire in Mid-Sweden in 2012 (response rate 53%). Psychological distress was measured with GHQ-12 and multivariate logistic regression models were used in statistical analyses, adjusting for age and economic difficulties.

Results: The prevalence of psychological distress was higher in women (16.4%) than in men (11.3%; $p < 0.001$). The odds ratio between high and low educational levels was not statistically significant. Persons with medium educational level had a lower risk of psychological distress than persons with high educational level. Economic difficulties had a strong association with psychological distress, but the association between educational level and psychological distress remained unchanged after adjustment.

Conclusion: Even though there was a strong association between economic difficulties and psychological distress in this study, no inverse association between educational level and psychological distress was found. No indications are therefore found that differences in mental health problems would explain educational inequalities in general health in Sweden.

Strengths and limitations of this study

- The study is based on a considerable, representative sample of the general population in a large geographic area and covers a wide age group of men and women from 25 to 74 years.
- Internationally validated questionnaire (GHQ-12) was used to measure psychological distress and register data to measure educational level.
- As people with poor health and/or low education often have higher non-response rates, the response-rate of 53% may have led to underestimation of educational differences in mental health.
- The study is based on cross-sectional data which prevents any causal interpretations of the results.

Introduction

Social inequalities in health are well documented and have been found for several health outcomes such as mental health problems (1-3), self-rated health (4-5) and mortality (6). The most often used measures of socio-economic status include education, income and occupation. For mental health problems, there is strong evidence that low socioeconomic position is associated with severe mental health disorders such as major depression (7). Previous studies have also shown that less severe, so-called common mental disorders are significantly more frequent in socially disadvantaged groups, such as the unemployed and persons with low education, low income and poor material standard of living (1). Even though low education is consistently associated with common mental disorders (1) some previous studies have shown stronger associations with income or financial difficulties or strain than with educational level (2, 8). In addition, differences in this association between men and women have been reported (3). The association may therefore differ between populations, genders and national or cultural context, and may also change over time.

Mental disorders are the leading cause of disability worldwide (9) and social inequalities in health are a major public health challenge. In Sweden, there are large educational differences in self-rated health. Persons with low educational level have approximately twice as often poor self-rated health as persons with high educational level (5, 10). Mental health problems may thus have a mediating role in the association between education and self-rated health. Therefore it is important to examine educational differences in mental health.

Socioeconomic differences in common mental disorders are often examined using validated and reliable measures of minor mental health problems such as the General Health Questionnaire (GHQ). GHQ measures psychological distress, including depressive symptoms, anxiety and affective well-being (11). The aim of this study was to investigate the association between educational level and

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3 psychological distress among a population-based sample of men and women in Sweden in 2012.

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5 Also, the role of economic difficulties was investigated.
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10 11 **Methods**

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13 The study is based on a survey questionnaire sent to a random population sample in four counties in
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15 Mid-Sweden in 2012. The survey was carried out in collaboration with the Public Health Institute
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17 (now the Public Health Agency of Sweden) and the four counties (Uppsala, Sörmland, Västmanland
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19 and Örebro). The age range was 25-74 years and the study population included 24,510 respondents
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21 (response rate 53%).
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25 Information on gender, age and educational level were based on register data from Statistics
26
27 Sweden. Levels of education were categorised into compulsory school or equivalent education for
28
29 nine years or less, secondary education (10–12 years of education), and post-secondary education
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31 (more than 12 years of education). Current economic difficulties were assessed by asking whether
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33 the respondent had had problems with current expenditure for food, rent, bills, etc. during the past
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35 12 months (yes/no).
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40 *Psychological distress* was measured by the 12-item version of the General Health Questionnaire
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42 (GHQ-12) (11). The General Health Questionnaire is a widely used measure of minor psychiatric
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44 morbidity, which primarily reflects general, non-psychotic and context-free mental health problems
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46 in the recent past but is also predictive of more severe mental disorders (11). A recommended and
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48 commonly used cut off point of three or more symptoms was used in this study to indicate
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50 psychological distress (2, 11-12).
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3 The respondents gave their informed consent for applying the registry data by answering the
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5 questionnaire. After the record linkage, all identity information were removed before the material
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7 was handed over from Statistics Sweden to the county councils. Permission from the regional ethical
8
9 review board in Uppsala has been obtained (EPN 2012/256).
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11 12 13 *Statistical methods*

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15 Prevalence of psychological distress is reported by educational level and economic difficulties in men
16
17 and women. Differences between groups were tested using chi-squared statistics. Since the
18
19 prevalence of mental health symptoms is higher in younger age groups (8) multivariate logistic
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21 regression models adjusting for age (in 10-year groups), and in a second model also for economic
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23 difficulties, were carried out. The results are reported as odds ratios (OR) and 95 percent confidence
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25 intervals (95% CI) for psychological distress. SPSS, version 24, was used for all analyses.
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32 **Results**

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34 The prevalence of psychological distress was higher in women (16.4%) than in men (11.3%; $p < 0.001$).
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36 There were statistically significant but rather small differences between educational levels, with
37
38 somewhat higher levels of psychological distress at high educational level (table 1). There was,
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40 however, a strong association between economic difficulties and psychological distress in both men
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42 and women.
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Table 1. Prevalence of and odds ratios for psychological distress by educational level and current economic difficulties (all models adjusted for age) in men and women aged 25-74 years in 2012.

Variable	N	Psychological distress (%)	P-value for difference	Model 1 OR (95 % CI)	Model 2 OR (95 % CI)
Total	24510	14.1			
Men	11133	11.3	<0.001*		
Educational level			0.003		
Low	2279	10.3		1.02 (0.86, 1.22)	0.90 (0.75, 1.08)
Medium	5302	10.8		0.86 (0.76, 0.99)	0.80 (0.70, 0.92)
High	3552	12.8		1	1
Economic difficulties			<0.001		
No	9827	9.1			1
Yes	1283	29.0			3.79 (3.28, 4.37)
Women	13377	16.4			
Educational level			<0.001		
Low	2043	14.4		1.06 (0.91, 1.23)	0.93 (0.80, 1.08)
Medium	5988	15.4		0.90 (0.82, 1.00)	0.83 (0.75, 0.92)
High	5346	18.2		1	1
Economic difficulties			<0.001		
No	11394	13.3			1

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Yes	1946	34.8	3.07 (2.75, 3.43)
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* p-value for difference between men and women.

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4 In the age adjusted model, the odds ratio for psychological distress for the low educational level was
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6 not statistically significant when compared to the high educational level. Persons with medium
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8 educational level had a lower risk of psychological distress than persons with high educational level.
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10 Further adjustment for economic difficulties showed that economic difficulties had a strong
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12 association with psychological distress, but the association between educational level and
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14 psychological distress remained practically unchanged. No statistically significant differences were
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16 observed in the odds ratios for educational level and economic difficulties between men and women.
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23 **Discussion**

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25 The findings of this study suggest that there is no inverse association between educational level and
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27 psychological distress in this adult population in Sweden. A strong association between economic
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29 difficulties and psychological distress was however found. The associations between educational
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31 level, economic difficulties and psychological distress were rather similar in men and in women even
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33 though the prevalence of psychological distress was higher among women.
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38 The results are in line with a national Swedish study where economic hardship was strongly
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40 associated with psychological distress (12). In that study, the independent effect of educational level
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42 was however not studied. Several previous studies have shown educational differences in mental
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44 health problems (1) but a weak association between educational level and common mental disorders
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46 has been observed in a working population in Finland (2). No association between low education and
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48 poor mental health has been reported from some studies in Sweden (7, 13) whereas a Danish study
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50 showed a relationship between low education and high prevalence of both minor and major
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52 depression (14). A strong association between low education and clinical depression has also been
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54 reported among representative population-based studies conducted in Finland, Poland and Spain
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3 (15). These findings suggest that low education may be more consistently related to severe mental
4 health problems than to minor psychiatric morbidity.
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9 The association between educational level and mental health was similar in men and women in our
10 study. This is in line with several previous studies (2, 13) and does not confirm the gender differences
11 found, for example, in Canada (3).
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17 The current study has some limitations. The response rate was 53%. As people with poor health
18 and/or low education often have higher non-response rates, this may lead to underestimation of
19 educational differences in mental health. Nevertheless, the strong association between economic
20 difficulties and psychological distress suggests that the results may not be severely underestimated.
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22 In addition, the study is based on cross-sectional data which prevents any causal interpretations of
23 the results. Similar results on the lack of association between low educational level and
24 psychological distress have, however, been reported from a longitudinal study in Sweden (13). An
25 association between income and psychological distress was found in the longitudinal study, but the
26 association was much weaker than the association between economic difficulties and psychological
27 distress found in the present study.
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41 One of the advantages of the present study is that it is based on a considerable, representative
42 sample of the general population in a large geographic area and covers a wide age group of men and
43 women from 25 to 74 years. Although the study was limited to four counties, it covers the general
44 adult population in these counties, comprising almost 1 million inhabitants. The prevalence of
45 psychological distress was also similar to the national average in Sweden (16). Another strength is the
46 use of GHQ-12 as a measure of psychological distress as it has been internationally validated (11).
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48 GHQ-12 has been used in several other studies to measure social inequalities in mental health
49 problems (2, 12-13). Similar results as for GHQ-12 have also been reported for other measures of
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3 common mental disorders such as the mental component summary of the Short Form-36 Health
4 Survey (SF-36) (2) and the fifth question of the European Quality of Life – 5 Dimensions scale (EQ-5D)
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7 (8). Educational level, age and gender were based on register data which increases the reliability of
8
9 these variables.

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13 Mental health problems may have a mediating role in the association between education and self-
14 rated health. In this study, no inverse association between educational level and psychological
15 distress was however found. On the basis of the results of this and other studies (8, 13), it is
16
17 therefore improbable that mental health problems would explain, or even have a significant
18
19 contribution to, educational inequalities in self-rated health, and even more general to health
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21 inequalities in Sweden. This applies to men and women alike. The notion that it is improbable that
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23 mental health problems would explain educational inequalities in self-rated health is further
24
25 supported by the fact that psychosocial factors have a weaker contribution to educational
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27 inequalities in self-rated health than material factors (17).

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34 In summary, no inverse association between educational level and psychological distress was found
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36 in this study. Persons with medium educational had even a somewhat lower level of psychological
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38 distress than persons with high education. The associations between educational level, economic
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40 difficulties and psychological distress did not differ between men and in women.
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Footnotes

Contributors: AM conceived the study and analysed the data. AM and FG interpreted the results and drafted and critically revised the manuscript. Both authors read and approved the final manuscript.

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Competing interests: None declared.

Ethics approval: The survey was approved by the regional ethical review board in Uppsala (EPN 2012/256).

Competing interests: None declared.

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Educational differences in psychological distress? Results from a population-based sample of men and women in Sweden in 2012

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51 Word count: 2422
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53 Keywords: Health inequalities, Psychological distress, Population surveys, Sweden
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Abstract

Background: Mental health problems are more frequent in socially disadvantaged groups, but the results vary between different studies, different populations and different measures of mental health. This paper investigated the association between educational level, economic difficulties and psychological distress in men and women in Sweden.

Methods: The study population included 24,510 respondents aged 25-74 years who responded a survey questionnaire in Mid-Sweden in 2012 (response rate 53%). Psychological distress was measured with GHQ-12 and multivariate logistic regression models were used in statistical analyses, adjusting for age, employment status and social support.

Results: The prevalence of psychological distress was higher in women (16.4%) than in men (11.3%; $p < 0.001$). Persons with low and medium educational level had a lower risk of psychological distress than persons with high educational level after adjustment for confounders. Economic difficulties had a strong association with psychological distress (OR=2.80 (95% CI: 2.39, 3.27) and OR=2.40 (95% CI: 2.12, 3.71) in men and women, respectively), after adjustment for confounders.

Conclusion: We found a strong association between economic difficulties and psychological distress in this study, but no inverse association between educational level and psychological distress. On the contrary, persons with high education had more psychological distress than persons with low and medium education when age, employment status and social support were taken into account. The findings were similar in men and women.

Strengths and limitations of this study

- The study is based on a considerable, representative sample of the general population in a large geographic area and covers a wide age group of men and women from 25 to 74 years.
- Internationally validated questionnaire (GHQ-12) was used to measure psychological distress and register data to measure educational level.
- As people with poor health and/or low education often have lower response rates, the response-rate of 53% may have led to under- or overestimation of the differences in mental health.
- The study is based on cross-sectional data which does not allow interpretations of the direction of the observed associations.

Introduction

Social inequalities in health are well documented and have been found for several health outcomes such as mental health problems (1-3), self-rated health (4-5) and mortality (6). The most often used measures of socio-economic status include education, income and occupation. Mental health problems are the leading cause of disability worldwide (7) and have large economic and social consequences both for the individual and society. For mental health problems, there is strong evidence that low socioeconomic position is associated with severe mental health disorders such as major depression (8-9). Previous studies have also shown that less severe mental health problems are significantly more frequent in socially disadvantaged groups, such as the unemployed and persons with low education, low income and poor material standard of living (1).

Even though low education is consistently associated with mental health problems (1) some previous studies have shown stronger associations with income or financial difficulties or strain than with educational level (2, 10-12). Some studies have even found that the association is stronger for financial difficulties than for income (2, 11). It has been suggested that the egalitarian socioeconomic policies in the Nordic countries may reduce the effect of income on health (11). However, also a longitudinal study in Britain found that financial strain in form of self-reported economic difficulties is a better independent predictor for future psychiatric morbidity than poverty and unemployment (13). In addition, differences in the association between educational level and mental health problems in the form of psychological distress between men and women have been reported (3). The associations may therefore differ between populations, genders and national or cultural contexts, and may also change over time.

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3 Socioeconomic differences in minor mental health problems are usually examined using validated
4 and reliable measures such as the General Health Questionnaire (GHQ), SF-36 Mental Health
5 Component Summary or the 5th Question of the European Quality of Life Instrument (EQ-5D). GHQ
6
7 measures psychological distress, which includes depressive symptoms, anxiety and affective well-
8
9 being (14). It is a widely used measure of minor psychiatric morbidity, which primarily reflects
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11 general, non-psychotic and context-free mental health problems in the recent past but is also
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13 predictive of more severe mental disorders (14).
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19 A longitudinal study in Sweden investigated the associations between socioeconomic status and the
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21 risk of psychological distress and depression (12). The results showed that education was unrelated
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23 to either outcome among men and women whereas income was associated with the risk of both
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25 outcomes and that the strength of the associations increased with symptom severity. The role of
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27 financial difficulties was not assessed in that study. A cross-sectional study based on the national
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29 public health survey in Sweden assessed the association between economic hardship and mental
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31 health problems, but the independent effect of educational level was not studied (11).
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36 The aim of this study was therefore to investigate the association between educational level,
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38 economic difficulties and mental health problems in the form of psychological distress in a
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40 population-based sample in Sweden in 2012. Also, possible differences in these associations between
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42 men and women were assessed.
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49 **Methods**

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51 The study is based on a survey questionnaire sent to a random population sample in four counties in
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53 Mid-Sweden in 2012. The survey was carried out in collaboration with the Public Health Institute
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55 (now the Public Health Agency of Sweden) and the four counties (Uppsala, Sörmland, Västmanland
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3 and Örebro). The age range was 25-74 years and the study population included 24,510 respondents
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5 (response rate 53%).
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9 Information on gender, age and educational level were based on register data from Statistics
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11 Sweden. Levels of education were categorised into compulsory school or equivalent education for
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13 nine years or less, secondary education (10–12 years of education), and post-secondary education
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15 (more than 12 years of education). Current economic difficulties were assessed by asking whether
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17 the respondent had had problems with current expenditure for food, rent, bills, etc. during the past
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19 12 months (yes/no).
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24 *Psychological distress* was measured by the 12-item version of the General Health Questionnaire
25
26 (GHQ-12) (14). A recommended and commonly used cut off point of three or more symptoms was
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28 used in this study to indicate psychological distress (2, 11, 14).
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32 Since employment status and social support are associated with mental health problems (10) we
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34 considered them as potential confounders. Employment status was derived from a survey question
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36 about whether the respondent was employed, self-employed, student, unemployed, on sickness
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38 leave (more than 3 months), on disability pension or retired. Social support was assessed by the
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40 question: “Do you have anyone you can share your innermost feelings with and confide in?” (yes/no).
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45 The respondents gave their informed consent for applying the registry data by answering the
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47 questionnaire. After the record linkage, all identity information were removed before the material
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49 was handed over from Statistics Sweden to the county councils. Permission from the regional ethical
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51 review board in Uppsala has been obtained (EPN 2012/256).
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55 *Patient and public involvement*
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3 The study did not involve patients. The results of the survey are disseminated to the public through
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5 websites of the four County Councils.
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8 9 *Statistical methods*

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11 Prevalence of psychological distress is reported by educational level and economic difficulties in men
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13 and women. Multivariate logistic regression models were used to examine the association between
14
15 educational level, economic difficulties and psychological distress. Separate models were run for men
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17 and women. Since the prevalence of mental health problems is higher in younger age groups (8) all
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19 the models were adjusted for age (in 10-year groups). The first model only included age and
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21 educational level as independent variables. In the second model economic difficulties were added. In
22
23 the final model, the potential confounders employment status and social support were also included.
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25 The results are reported as odds ratios (OR) and 95 percent confidence intervals (95% CI) for
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27 psychological distress. SPSS, version 24, was used for all analyses.
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34 **Results**

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36 About half of the study population had medium educational level (table 1). About one in ten had only
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38 compulsory education and 32% of the men and 40% of the women had post-secondary education.
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40 12% of the men and 15% of the women reported economic difficulties during the last 12 months.
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Table 1. Characteristics of the study population, men and women aged 25-74 years in 2012.

Variable	Men	Women
N	11133	13377
Age (mean, SD)	55.4 (13.5)	53.4 (13.8)
Educational level (%)		
Low	20.5	15.3
Medium	47.6	44.8
High	31.9	39.9
Economic difficulties (%)		
No	88.4	85.4
Yes	11.6	14.6
Employment status (%)		
Employed	52.0	56.8
Self-employed	10.6	4.1
Student	1.4	2.9
Unemployed	2.9	3.5
On sickness leave	1.9	3.4
On disability pension	2.8	4.4
Retired	28.3	24.9
Social support (%)		
Yes	87.7	90.9
No	12.3	9.1

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3 The prevalence of psychological distress was higher in women (16.4%) than in men (11.3%; $p < 0.001$).

4
5 There were rather small differences between educational levels, with somewhat higher levels of
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7 psychological distress at high educational level (table 2). There was, however, a strong association
8
9 between economic difficulties and psychological distress in both men and women.
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13 In the age adjusted model, the odds ratio for psychological distress for the low educational level was
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15 not statistically significant when compared to the high educational level (table 2). Persons with
16
17 medium educational level had a lower risk of psychological distress than persons with high
18
19 educational level. Further adjustment for economic difficulties showed that economic difficulties had
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21 a strong association with psychological distress, but the association between educational level and
22
23 psychological distress remained practically unchanged. Further adjustment for employment status
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25 and social support attenuated somewhat the odds ratio for economic difficulties but the association
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27 remained strong and statistically significant. The odds ratio for psychological distress at low
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29 educational level became statistically significantly below one. No statistically significant differences
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31 were observed in the odds ratios for educational level and economic difficulties between men and
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33 women.
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Table 2. Prevalence and odds ratios (OR) from multivariate logistic regression models for psychological distress by educational level and current economic difficulties in men and women aged 25-74 years in 2012.

Variable	N	Psychological distress (%)	Model 1 OR (95 % CI)	Model 2 OR (95 % CI)	Model 3 OR (95 % CI)
Total	24510	14.1			
Men	11133	11.3			
Educational level					
Low	2279	10.3	1.02 (0.86, 1.22)	0.90 (0.75, 1.08)	0.78 (0.65, 0.95)
Medium	5302	10.8	0.86 (0.76, 0.99)	0.80 (0.70, 0.92)	0.75 (0.65, 0.87)
High	3552	12.8	1	1	1
Economic difficulties					
No	9827	9.1		1	1
Yes	1283	29.0		3.79 (3.28, 4.37)	2.80 (2.39, 3.27)
Women	13377	16.4			
Educational level					
Low	2043	14.4	1.06 (0.91, 1.23)	0.93 (0.80, 1.08)	0.72 (0.61, 0.85)
Medium	5988	15.4	0.90 (0.82, 1.00)	0.83 (0.75, 0.92)	0.73 (0.66, 0.82)
High	5346	18.2	1	1	1
Economic difficulties					
No	11394	13.3		1	1

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Yes	1946	34.8	3.07 (2.75, 3.43)	2.40 (2.12, 2.71)
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Model 1: Adjusted for age.

Model 2: Adjusted for age and economic difficulties.

Model 3: Adjusted for age, economic difficulties, employment status and social support.

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Discussion

The findings of this study suggest that there is no inverse association between educational level and psychological distress in this adult population in Sweden. A strong association between economic difficulties and psychological distress was however found. The associations between educational level, economic difficulties and psychological distress, respectively, were rather similar in men and in women even though the prevalence of psychological distress was higher among women.

Several previous studies have shown educational differences in mental health problems (1) but a weak association between educational level and common mental disorders has been observed for example in a working population in Finland (2). No association between low education and mental health problems has been reported from some studies in Sweden (10,12) whereas a Danish study showed a relationship between low education and high prevalence of both minor and major depression (15). A strong association between low education and clinical depression has also been reported among representative population-based studies conducted in Finland, Poland and Spain (16). These findings suggest that low education may be more consistently related to severe mental health problems than to minor psychiatric morbidity.

The results concerning economic difficulties are in line with a national Swedish study where economic hardship was strongly associated with psychological distress (11). Several other studies have also shown stronger associations with income or financial difficulties or strain than with educational level (2, 10, 12). Of the measures of socio-economic positions, educational level is usually the most distant and acquired first. It affects occupation and employment status which in turn contribute to income. Income contributes to material standards of living and purchasing power. Yet, economic difficulties reflect more proximate and accumulated influences or may be more

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3 related to adverse changes in living conditions which may contribute to their stronger association
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5 with mental health problems (1-2, 11, 13).
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9 The association between educational level and psychological distress was similar in men and women
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11 in our study. This is in line with several previous studies (2, 12) and does not confirm the gender
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13 differences found, for example, in Canada (3). Also the association between economic difficulties and
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15 psychological distress was similar in both genders reconfirming the findings from some previous
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17 studies (2, 11).
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21 The current study has some limitations. The response rate was 53%. As people with poor health
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23 and/or low education often have lower response rates, this may lead to underestimation of
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25 educational differences in mental health. Also, an overestimation of the association is possible (17).
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27 Nevertheless, the strong association between economic difficulties and psychological distress
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29 suggests that the results should not be severely underestimated. In addition, the study is based on
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31 cross-sectional data which prevents any interpretations of the direction of the results. It is possible
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33 that mental health problems lead to reduced educational attainment, reduced income and higher
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35 level of economic difficulties. Previous longitudinal studies have, however, shown that the main
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37 direction is from income and economic difficulties to mental health problems (9, 12-13).
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42 In our analysis we adjusted for employment status and social support in the final model. The
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44 association between economic difficulties and psychological distress was somewhat attenuated after
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46 this adjustment, especially among men, indicating that a part of the association may be explained by
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48 increased economic difficulties due to unemployment, long-term sickness leave or disability pension,
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50 but the association still remained strong after the adjustment both in men and women. On the other
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52 hand, after full adjustment, the odds ratio for low educational level became statistically significantly
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54 below one indicating that persons with low education have less psychological distress than persons
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3 with high education when employment status and social support are taken into account. Data on
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5 some other potential confounders such as personal history of mental health problems was not
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7 available and therefore some residual confounding is possible. Furthermore, a common method bias
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9 may have affected the association between economic difficulties and psychological distress since
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11 both the exposure and outcome were self-reported. This, however, is more likely to lead to an
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13 underestimation than to an overestimation of the association (18).
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17 We used one measure of mental health problems, psychological distress (GHQ-12), in this study.
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19 Some previous studies have combined several measures. Lahelma et al. (2) used both GHQ-12 and
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21 SF-36 Mental Component Summary to examine the association between socioeconomic position and
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23 common mental disorders in their study among Finnish employees and found similar results for both
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25 measures as well as two different cut-off points for GHQ-12 indicating severity. Ahnquist and
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27 Wamala (11) used three different indicators of mental health problems in their study of the Swedish
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29 population: psychological distress (GHQ-12), severe anxiety and use of antidepressant medication.
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31 Even they found that the association between economic hardship and mental health problems was
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33 unrelated to the indicator used.
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38 One of the advantages of the present study is that it is based on a considerable, representative
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40 sample of the general population in a large geographic area and covers a wide age group of men and
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42 women from 25 to 74 years. Although the study was limited to four counties, it covers the general
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44 adult population in these counties, comprising almost 1 million inhabitants. The prevalence of
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46 psychological distress was similar to the national average in Sweden (19). Another strength is the use
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48 of GHQ-12 as a measure of psychological distress as it has been internationally validated (14). GHQ-
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50 12 has been used in several other studies to measure social inequalities in mental health problems
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52 (2, 11-12). Similar results as for GHQ-12 have also been reported for other measures of mental health
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54 problems such as the mental component summary of the Short Form-36 Health Survey (SF-36) (2)
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3 and the fifth question of the European Quality of Life – 5 Dimensions scale (EQ-5D) (10). Educational
4 level, age and gender were based on register data which increases the reliability of these variables.
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9 Mental health problems are the leading cause of disability worldwide (7) and social inequalities in
10 health are a major public health challenge. In Sweden, there are large educational differences in self-
11 rated health. Persons with low educational level have approximately twice as often poor self-rated
12 health as persons with high educational level (5, 20). As mental health problems are strongly
13 associated with self-rated health (21), mental health problems may have a mediating role in the
14 association between education and self-rated health. In this study, no inverse association between
15 educational level and psychological distress was however found. It is therefore improbable that
16 mental health problems would explain educational inequalities in self-rated health. The notion is
17 further supported by the fact that psychosocial factors have a weaker contribution to educational
18 inequalities in self-rated health than material factors (22). In this study persons with high education
19 had more psychological distress than persons with low and medium education after adjustment for
20 confounders. Further studies are required in order to explain the positive association between
21 educational level and psychological distress.
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38 In summary, no inverse association between educational level and psychological distress was found
39 in this study. Persons with medium educational had a somewhat lower level of psychological distress
40 than persons with high education. After adjustment for employment status and social support even
41 persons with low educational level had less psychological distress than those with high education.
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43 However, a strong association between economic difficulties and psychological distress was found.
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45 The associations between educational level, economic difficulties and psychological distress did not
46 differ between men and in women.
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Footnotes

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36 drafted and critically revised the manuscript. Both authors read and approved the final manuscript.
37

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40 Sörmland, Uppsala and Örebro.
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46 2012/256).
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48 **Competing interests:** None declared.
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53 **Data sharing statement:** No additional data available.
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