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Not engaged in education, employment or training (NEET) in an Arctic sociocultural context: The NAAHS cohort study

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|-------------------------------|---|
| Journal: | <i>BMJ Open</i> |
| Manuscript ID | bmjopen-2018-023705 |
| Article Type: | Research |
| Date Submitted by the Author: | 23-Apr-2018 |
| Complete List of Authors: | Bania, Elisabeth; NTNU, Department of Mental Health Eckhoff, Christian; University Hospital of North Norway, Child and Adolescent Psychiatry; UiT The Arctic University of Norway, Department of Clinical Medicine Kvernmo, Siv; UiT The Arctic University of Norway, Department of Clinical Medicine; University Hospital of North Norway, Department of Child and Adolescent Psychiatry |
| Keywords: | MENTAL HEALTH, PUBLIC HEALTH, HEALTH ECONOMICS, Child & adolescent psychiatry < PSYCHIATRY, SOCIAL MEDICINE |
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8 Not engaged in education, employment or training (NEET) in an Arctic
9 sociocultural context: The NAAHS cohort study
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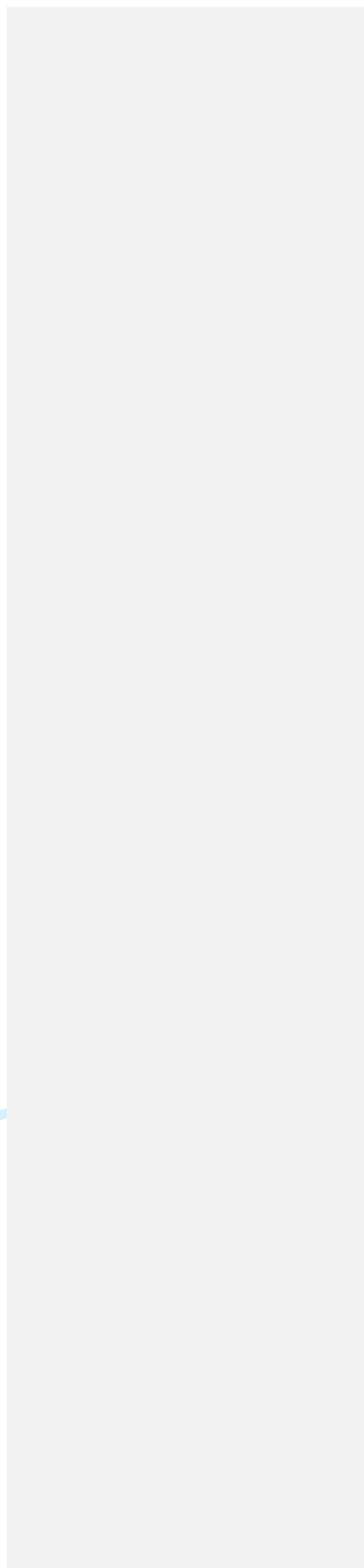
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33 Running title: Not engaged in education, employment or training (NEET)
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35 Words: 3630
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ABSTRACT

Objectives

The purpose of the study is to explore the prevalence and predictors of NEET (Not engaged in education, employment or training) in a multicultural young adult population in northern Norway.

Design and setting

The Norwegian Arctic Adolescent Health Study (NAAHS) is a cross-sectional, school-based survey conducted in 2003–2005. The NAAHS was linked with registry data from the National Education Database (NUDB) and the National Insurance Registry (FD-Trygd).

Participants

Of all 5,877 tenth graders (aged 15–16 years) in Northern Norway, 83% of the total age cohort from all 87 municipalities participated in the survey. The follow-up studies consisted of with 3,987 consent giving adolescents (68%), were 365 (9.2%) reported indigenous Sami ethnicity.

Outcome measures

Youth not engaged in education, employment or training (NEET) at the age of 23–25 years old.

Methods

NEET was defined by no educational engagement, long-term recipient of sickness benefit, medical and non-medical benefit receipt or long-term unemployment. Logistic regression was used for the multivariable analyses for the association with later NEET, stratified by gender.

Results

Mental health problems and musculoskeletal pain in adolescence were associated with later NEET. We found lower parental education to be significantly associated with NEET in young adulthood. Gender differences for later NEET were minor in this study, although female NEET was significantly higher than among males.

Conclusions

To address the disengagement of education and work, particular emphasis must be placed on supporting young people struggling with mental and physical health problems.

Strengths and limitations of this study

- The main strength of this study is the linkage of a large population-based study in adolescents (2003-2005) to the National Education Database (NUDB) (2005-2012) and the National Insurance Registry (FD-Trygd) (2008-2012)
- The registry data linkage enabled us to follow the educational and work related footprints of young adults over a decade
- Disengagement by NEET is complex and a broad variety of factors influence youngsters
- The cross-sectional self-reported survey by adolescents has a risk of information bias
- New concepts as NEET (not engaged in education, employment or training) can leave out youngsters at risk, and is not a completely objective outcome term

Key words

NEET, young adults, parental education, mental health problems, musculoskeletal pain, indigenous

INTRODUCTION

A tax-funded, redistributive welfare state, with universal entitlements and generous contributions for social and financial security is shown to protect against crime and social injustice (1). However, the negative consequence can be that some young adults choose welfare benefits over employment and work-based income (2, 3). International studies suggest that recipients of social welfare benefits are associated with later work exclusion, or more fair to say, lack of work inclusion (4). Work is also an important source of social inclusion and affects health in a positive way (5). The individual and the society therefore, have an interest in youth starting adult life in education, employment or in training.

Work marginalization can be defined as being on the border of the labour market. The person is not fully integrated in, but not permanently excluded from, the labour market (6). In empirical research, the common source of data used to study marginalization has been information on unemployment, long-term absence and social-welfare benefit receipt (7). Normann et al. (6) explained how work marginalization can be viewed from an individual or from a sociocultural perspective. The work approach as a norm in society, means that most individuals will be integrated into the labour force (7). However, some people may for different reasons, voluntarily choose not to participate in the labour force (1).

Olsen et al. (8) describe the term NEET, and its plural NEETs, as the acronym for "not in education, employment or training". NEET refers to young people who have dropped out of education, training or work, and who may not register as unemployed as there is little financial incentive to sign on as unemployed. Over time, young people who experience NEET are at risk of permanent social exclusion. The term NEET was coined by the UK Department for Education, which uses it for quarterly statistics (9). The age group covered by the UK statistics is from 16 to 18 years of age, but definitions may vary. Nordic researchers use this term to describe youth marginalized from employment and education (8). Youth unemployment is of the greatest concern within the OECD (10). However, the OECD focus is expanded to include those not only not in education and employment but also those not in training – NEET (11).

The NEET term is questioned and criticized (12). Rightly so, new concepts need to be introduced, questioned and developed. NEET can be seen as a collective term for including youth who are vulnerable, and the concept can be a useful tool for targeting means of intervention (12). Oliver et al. (13) emphasizes that interventions for engaging people experiencing NEET may work well in rural, not urban areas, during economic growth and not retention, or in conservative but not liberal societies.

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In general, individuals with less education or income, and who are unemployed report poorer health (14). In general, Norwegians are reported to be in good health, compared with the OECD average; 73 % versus 69 %, respectively (15). In spite of this, Norway has the highest incidence of sickness absence and greatest disability caseload in the OECD (15).

Six point three percent of all young people in Norway received social welfare benefits within a year and for at least a one-month period. More than 60% of the recipients were single person households (16). According to Statistics Norway the number of social welfare benefit recipients has been stable since 2005 (17). Young males, 18–24 years old, represent the greatest concern, as they make up the majority of the social welfare recipients. Internationally, young women are overrepresented in experiencing NEET, which may be caused by teenage pregnancy and young parenthood (18). Concerns regarding NEET are triple regardless of gender and reasons: the cost of social welfare benefits, the lack of tax income caused by work exclusion, and the public health issues related to work marginalization and poor health.

Minority youth, Sami young people included, are shown to be at higher risk of experiencing work marginalization and possible social exclusion due to non-completion of upper secondary school, lower tertiary education and thereby unemployment and poor health (17, 19-22). Young adults in rural and remote Northern Norway have dropped out of upper secondary school and have higher unemployment rates than their fellow peers in the rest of Norway (17, 21, 23).

Parents can act as role models for adolescents when it comes to educational achievement, and thereby work (24). Young people's engagement for own education and work are influenced by parental education level and socioeconomic status (SES), such as income and job positions (25, 26).

The two most prevalent public health issues, mental health disorders and musculoskeletal pain problems, are costly to the quality of life for young people (27-29), their families (28, 31) and society (30, 32-36).

Mental health problems in adolescence and young adulthood have been found to be associated with reduced workforce participation and increased medical welfare benefits in young adulthood (37-39). Mood and anxiety disorders are the most prevalent mental health disorders resulting in long-term medical benefits in Norway (40) and are the mental health disorders with the strongest relationship with adolescent musculoskeletal pain (41). Adolescent musculoskeletal pain has been found to be associated with later medical and social welfare benefit receipt in young adulthood (42). Studies in adults have shown that multisite pain predicts long-term medical benefits, both overall (33) and with comorbid

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6 mental health disorders (43). Continuous sickness benefits of more than eight weeks have
7 been found to be predictive of later disability pension, especially due to mental health and
8 musculoskeletal disorders, in Norwegians under 40 years of age (44). There has been an
9 increase in long-term medical benefit recipients due to mental health disorders in 18–29-year-
10 olds in Norway (40, 45) over the last decades. Mental health disorders are the reason for
11 medical rehabilitation benefits in two out of three cases in those under the age of 30, with a
12 30% increase from 1996–2008 primarily due to mood and anxiety disorders (40) .

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16 Research on these issues, especially in youth, can make an important contribution to
17 public health work. A study with emphasis on sociocultural context, musculoskeletal pain and
18 mental health in adolescence and later NEET has to our knowledge not been done previously.

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20 The first aim of this study was to explore the prevalence of young adults not engaged
21 in education, employment or training (NEET) defined by no educational engagement, long-
22 term recipient of sickness benefit, medical and non-medical benefit receipt or long-term
23 unemployment in an unselected population of young people in Arctic Norway.

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25 The second aim was to determine the importance of relevant factors, such as socio-
26 demographic factors; gender, ethnicity, parents' socioeconomic status by parental education
27 level, and residency.

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29 The third aim was to explore the significance of self-reported mental health and
30 musculoskeletal pain in adolescence in relation to later NEET in this young adult population.

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32 We expected that male gender, residency in northernmost and sparsely populated
33 Finnmark County, Sámi ethnicity, self-reported mental health problems and musculoskeletal
34 problems would be associated with NEET in young adulthood, whereas higher parental
35 education level and female gender would act as a protective factor.

36 37 38 39 40 41 **METHODS**

42 **Study design**

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44 The Norwegian Arctic Adolescent Health Study (NAAHS) was conducted from
45 January 2003 until January 2005. All tenth grade students in all lower secondary schools in
46 the three northernmost Norwegian counties were invited to participate in this study. The
47 NAAHS was linked to the National Insurance Registry (FD-Trygd) and the National
48 Education Data Base (NUDB) for the period 2003–2013. The registry databases provide
49 information about each person's medical and social welfare benefits, unemployment and
50 educational achievements up to 25–26 years of age for the study sample.

Sample and participants involvement

The participants included 4,881 of the total age cohort of 5,877 (83%) adolescent tenth grade students in lower secondary school (15–16 years of age). The questionnaires were administered during a two-hour period in a classroom setting monitored by project staff, and non-attending students completed them later. The questionnaire was available in both the Sami and Norwegian languages. The following response rates were observed for the three counties: Finnmark, 71%, Troms, 82% and Nordland, 88%.

A total of 3,987 (68% of the total age cohort) of the adolescents gave their written consent to later follow-up studies including linkage to registry data, in which 9.2% of the registry sample were indigenous Sami.

The Regional Committee for Medical and Health Research Ethics approved the NAAHS and the registry linkage.

Outcome measures

Not engaged in education, employment or training (NEET) was defined as participants who had not completed tertiary education during the study period and either been registered as 100% unemployed for more than one year, or received six or more months of sickness benefits, or received six or more months of social welfare benefits during a 12-month period, or received medical rehabilitation benefits or disability pension during the entire study period. Data was based on the available data from the National Insurance Registry (FD-Trygd) and the National Education Data Base.

Primary predictors

Mental health problems

Strength and Difficulties Questionnaire (SDQ) (46) has a parent, teacher and a youth version. In this study, only the SDQ self-report (SDQ-S) was used. The algorithms in SDQ have problem scales for three broad-spectrum categories of problems: conduct problems, emotional problems, and hyperactivity/attention problems, as well as an impact score related to family, friends, learning situation, and leisure activities.

The SDQ is a brief behavioural screening questionnaire that asks about 25 attributes, some positive and others negative. The 25 SDQ items are divided between five scales of five

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6 items each, generating scores for conduct problems, hyperactivity-inattention, emotional
7 symptoms, peer problems and prosocial behaviour; all but the last one is summed to generate
8 a total difficulties score. The extended version of the SDQ includes not just the 25 items on
9 symptoms and positive attributes but also an impact supplement that asks whether the
10 respondent thinks that the child or teenager has a problem, and if so, enquires further about
11 overall distress, social impairment, burden and chronicity. All five subscales are used in this
12 study, as well as the functional impact scale; The Prosocial Behaviour scale (SDQ-prosocial)
13 ($\alpha=.65$), the Peer Problem Scale (SDQ-peer) ($\alpha=.52$), the Emotional Symptom Scale (SDQ-
14 emotional) ($\alpha=.70$), the Conduct Problem Scale (SDQ-conduct) ($\alpha=.47$), and the
15 Hyperactivity-Inattention Scale (SDQ-hyper) ($\alpha=.64$).

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20 The subscales have five items each with scores from 0 to 2 on each item, indicating; 0= Not
21 correct, 1= Correct sometimes 2= Totally correct. The Prosocial subscale has inverse scores.

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24 The subscale SDQ-Impact scale (SDQ-impact) ($\alpha=.69$) was used, where a score of 10
25 implies the greatest functional impairment due to mental health problems in home life,
26 friendships, classroom activities and leisure activities. Mean scores operationalized the scales.

27 28 29 **Musculoskeletal pain**

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31 *Musculoskeletal pain* was measured by “yes/no” answers to the question from NAAHS:
32 “During the last 12 months have you often been troubled by pain in the head, neck/shoulder,
33 arms/legs/knees, abdomen or back?” Abdominal pain was excluded due to the potential
34 confusion with menstrual pain. Headache was included based on its frequent co-existence
35 with musculoskeletal pain and their shared mechanisms and risk factors (47). The question
36 results in a variable ranging from zero to four pain sites.

37 38 39 40 **Explanatory factors from the NAAHS study**

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42 *Gender.* Female gender as the reference group.

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44 *Residency* refers to the county where the adolescent lived during lower secondary
45 school. The three northernmost counties in Norway were compared: Nordland, Troms and
46 Finnmark, of which Finnmark is the northernmost, as well as the most remote and most
47 sparsely populated county. Nordland county, the southernmost, has the highest number of
48 inhabitants, and is used as the reference group.

49
50 *Sami ethnicity* was measured by an assessment of parents` ethnicity, Sami language
51 competence in parents, grandparents and the participants, and ethnic self-identification.

Participants who had one or more of these affiliations present were classified as having Sami ethnicity (48). Non-Sami ethnicity was used as the reference group.

Parental socioeconomic status was measured by *parental education* level: parents' highest education was obtained from Statistics Norway's education registry, registered when the participants were 15–16 years old. Parental education was categorized from 'lower secondary' (≤ 10 th grade), 'upper secondary' (≤ 13 th grade), 'lower university degree' (up to 5 years) to 'higher university degree' (5 years or more) (49). Parental higher university degree was used as the reference group.

Data analysis

Groups were compared using Pearson's chi squared test for categorical data, and one-way ANOVA for continuous data. Logistic regression was used for the multivariable analyses for the association with later NEET, stratified by gender. We also examined for interaction terms between gender and adolescent problems and Sami ethnicity and adolescent problems. SPSS 22 was used for all analyses and the statistical significance level was set to .05.

RESULTS

In total, 3,987 (68%) of the adolescents gave their consent to the registry linkage. Of the registry sample, 50.1% were males, and 49.9% were females, and 9.2% of the participants were indigenous Sami (Table 1).

NEET in young adulthood was significantly higher among females (20.9 %) than among males (16.2%) (Table 1). Ethnic differences occurred as NEET among Sami males was significantly higher than among non-Sami males, 23.0% and 16.6% respectively (Table 2). Sami females experienced NEET to a lower degree (16.6%) than non-Sami females (20.8%). The difference was however, not statistically significant among females (Table 2).

A strong geographical trend occurred between young males from the counties of Nordland, Troms and Finnmark. Males from the northernmost Finnmark county showed a higher rate of NEET ($p=.052$) than among male counterparts from Nordland and Troms counties (Table 2). This geographical trend was not found among females.

(Insert Tables 1 and 2 about here)

The multivariable analyses of the association between sociodemographic factors, adolescent mental health problems, adolescent musculoskeletal pain and later NEET are presented in

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6 Table 3. Participants with parents with a lower secondary education level had a significantly
7 higher risk of NEET at all analytical levels for both genders, compared to participants with
8 parents with a higher university degree. Male participants with parents with upper secondary
9 education level showed a similar association on all analytical levels of significantly higher
10 NEET, compared with male participants with parents with a higher university degree (Table
11 3).

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15 Among the sociodemographic variables, residency in Finnmark county indicates a
16 tendency ($p=.09$) of more NEET among males, even when adjusted for adolescent mental
17 health problems and musculoskeletal pain. Sami ethnicity was a significant predictor for more
18 NEET in males, but non-significant for later NEET in females (Table 3). In both genders the
19 sociodemographic variables alone accounted for a small percentage of the explained variance
20 (between 1–2%) of later NEET.
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23 For both males and females, the explained variance increased with 6–7.3% when
24 adolescent mental health and musculoskeletal pain were included in the model. In the
25 unadjusted analyses, all types of mental health behaviour, except for prosocial behaviour,
26 were significantly associated with later NEET for both genders. In both genders, peer
27 problems were a significant predictor of NEET both in the unadjusted and fully adjusted
28 analyses. However, in the fully adjusted model the impact of the other mental health problems
29 on NEET differed between males and females. In females, hyperactivity was the only
30 remaining significant predictor of later NEET, while in males conduct problems and
31 musculoskeletal problems were associated with later NEET.
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34 We found no significant interactions for later NEET for either Sami ethnicity or
35 gender by the adolescent problems at the .05 level.
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44 **DISCUSSION**

45 **Main findings**

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47 We found mental health problems and musculoskeletal pain in adolescence were associated
48 with later NEET. Lower parental education was found to be significantly associated with
49 NEET in young adulthood. Gender differences in predictors for later NEET were minor in
50 this study, although female NEET was significantly higher than among males.
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Interpretation of the results and comparison to previous findings

To our knowledge, this study is the first to explore the prediction of adolescent musculoskeletal pain and mental health problems on later work and education marginalization operationalized by NEET in a representative sample of indigenous and non-indigenous adolescents in the Arctic.

The proportion of participants who were classified with NEET in young adulthood was high, at 18.6%. In spite of a high living standard Norway has a high incidence of sickness absence and disability caseload in the OECD (15). Eckhoff et al. (42) found that 17.2% of the participants in the NAAHS study had received any level of social welfare benefits during the entire study period of up to 10 years. The large number of recipients among a cohort of young people is worrying. The foundation of a sustainable welfare society is its working inhabitants (1). Female NEET in this study was found to be significantly higher than male NEET. This is in accordance with OECD (18). However, female NEET within the OECD is associated with teenage pregnancy and young parenthood (50). Norway has a low prevalence of teenage pregnancy and has means related to bringing young mothers into education and work, both through student loans, social housing, social entitlements, kindergartens and benefits for young single mothers and young parents (1, 17). There could be other explanations for the higher proportions of female NEET, as national statistics show that young females report difficulties in living conditions; loneliness, inactive lifestyle, and they report mental health problems (16).

Several studies have shown that females in ethnic minorities around the world experience poorer health and NEET to a larger extent than their majority peers (22, 51). Our study, however did not confirm such findings as Sami females were less likely than majority peers to experience NEET in young adulthood. Recent studies among the NAAHS cohort show that the indigenous Sami youth do not differ much from their majority peers in completing upper secondary school (21), and that Sami minority young people complete tertiary education equally as much, or more, than majority Norwegians (20). In this study Sami males however, significantly experienced more NEET in young adulthood. This supports earlier findings of lower educational aspirations (19), and higher drop-out rates from upper secondary school in Sámi young males than in majority male peers (21). As education is an important key factor for good health and work inclusion (22) this risk position of indigenous Sami males is concerning.

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The finding that lower levels of parental education and peer problems in adolescence across gender were associated with NEET in young adulthood indicate the importance of relational and environmental conditions on young peoples' education and work marginalization. Garg et al. (24) suggested that family background predicts educational aspirations with respect to academic self-concept, as highly educated parents can serve as role models for their children, and thereby prevent NEET.

The findings in this study revealed that mental health problems in females, by peer problems and hyperactivity were associated with later NEET. This pattern is seen in other studies among the same female group of young people when it comes to high school dropout (21) and partly for tertiary education (20). The awareness is expressed by Myklestad et al. (52) who suggest that poor mental health contributes to high school dropout or lower educational achievement (20, 21), and later work marginalization by disability pension (53). SDQ's hyperactivity scale used in this study also includes attention problems, which are shown to cause problems in school. The effect of poor mental health on educational achievement, but also work marginalization was in this study also shown for the males, as adolescent conduct problems and musculoskeletal pain were found to be associated with later NEET in males.

Methodological strengths and limitations

The main strength of this study is the linkage of an unselected population-based study to registry data. The study had an equal gender distribution and a high participation rate. The NAAHS participants refusing registry linkage were not worse off, thereby strengthening its generalizability (54).

Reliability and validity of brief scales, such as the SDQ, may be questioned (55). Cronbach's alpha was applied as a measure of internal consistency reliability, with a value of .70 or more considered reliable. The Conduct Problems Scale (SDQ-conduct) had a lower value, while subscales such as the Emotional Symptoms Scale (SDQ-emotions), the Prosocial Behaviour Scale (SDQ-prosocial), the SDQ-Impact Scale (SDQ-impact) and, the Hyperactivity Scale (SDQ-hyper) could be considered reliable. The Peer Problem Scale (SDQ-peer) had lower value with Cronbach's alpha of .52, and the validity of SDQ-peer as a psychometric tool is also questioned for certain ethnic groups of children due to the lack of sociocultural sensitivity. Williamson et al. (56) exemplifies the poor fit by the lack of questions of connection to extended family, ethnic identity and the impact and experience of racism.

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6 In this registry-linked study we were limited to only one cross-sectional study and the
7 findings in this study are assumed to be influenced by other or more present explanatory
8 factors, reflected by the relatively lower explained variances for later NEET. The survey was
9 answered during school time, and in a classroom setting. The cluster effect may influence the
10 responses given.
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13 The concept of NEET is questioned, and has limitations (12). However, NEET is a
14 tool with an outcome of primary interest, which will include changes in objective status. A
15 transition from NEET to non-NEET status, is a change from disengagement to engagement
16 (13) which can have important implications for young people's quality of life and health.
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19 20 **CONCLUSIONS**

21 Young people whose parents had lower educational status and those with disturbed peer
22 relations were at greater risk of NEET. Mental health problems and musculoskeletal pain in
23 adolescence were associated with later NEET. Gender differences in predictors for later
24 NEET were minor in this study, although female NEET was significantly higher than among
25 males. Particular emphasis must be placed on supporting young people struggling with mental
26 and physical health problems to avoid NEET. Targeted means can be effective, helping young
27 adults achieve desirable education and thereby work, income, well-being and health.
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29

30 31 **Contributors**

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33 EVB has contributed to the concept and design of the study, the acquisition of registry data,
34 analysis and interpretation of data, drafting and revising the manuscript. CE has contributed in
35 the analysis and interpretation of data, critical review and revision of the manuscript. SK has
36 been the project manager of the Norwegian Arctic Adolescent Health Study, being
37 responsible for the content of the questionnaire and the data collection. SK has supervised all
38 processes of drafting the manuscript. All authors have read and approved the final manuscript.
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44 45 **Funding**

46 The work was funded by the SpareBank 1 Nord-Norge Donations Fund and the Sami
47 Norwegian National Advisory Unit on Mental Health and Substance Use (SANKS), in
48 addition to the Department of Clinical Medicine, University of Tromsø, The Arctic
49 University of Norway as well as Regional Centre for Child and Youth Mental Health and
50 Child Welfare (RKBU Central Norway), Department of Mental Health,, Faculty of Medicine
51 and Health Sciences, NTNU . The researchers were independent of the funding bodies.
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Competing interests

None declared

Ethics approval

The study was approved by the Regional Committee for Medical and Health Research Ethics, reference number 18/2003 and 2012/1381. The adolescents had to provide written consent for later follow-up studies including linkage to registry data, and their parents were given written information about the study.

Provenance and peer review

Not commissioned; externally peer reviewed

Data sharing statement

No additional data are available

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Table 1 Sample characteristics of NEET in young adulthood and adolescent psychosocial problems and musculoskeletal pain.

| Factors | N | Total sample N=3987 | Females N=1991 | Males N=1996 | Gender difference | Sami n=365 | Non-Sami N=3280 | Ethnic difference |
|--------------------------------------|------|------------------------|-------------------|-----------------|-----------------------------|---------------|--------------------|-----------------------------|
| NEET | 3987 | 18.6% | 20.9% | 16.2% | 14.32 ^{p<.001} | 19.7% | 18.0% | 0.51 ^{p=.47} |
| Ethnicity | | | | | | | | |
| Sami | 365 | 9.2% | 9.4% | 8.9% | 0.11 ^{p=.75} | | | |
| Residency | | | | | 1.83 ^{p=.40} | | | 290.66 ^{p<.001} |
| Nordland county | 2104 | 52.8% | 51.9% | 53.7% | | 24.4% | 55.9% | |
| Troms County | 1310 | 32.9% | 33.9% | 31.9% | | 32.6% | 32.8% | |
| Finnmark county | 573 | 14.4% | 14.3% | 14.5% | | 43.0% | 11.3% | |
| Self-reported adolescent problems | | Mean (SD) | Mean (SD) | Mean (SD) | | Mean (SD) | Mean (SD) | |
| Mental health (SDQ) | | | | | | | | |
| Peer problems | 3944 | 1.84 (1.59) | 1.77 (1.60) | 1.91 (1.58) | 7.45 ^{p=.006} | 2.05 (1.65) | 1.81 (1.59) | 7.47 ^{p=.006} |
| Emotional problems | 3944 | 2.57 (2.20) | 3.45 (2.26) | 1.69 (1.73) | 755.23 ^{p<.001} | 2.52 (2.05) | 2.58 (2.22) | 0.24 ^{p=.62} |
| Prosocial behaviour | 3946 | 7.47 (1.82) | 8.04 (1.49) | 6.90 (1.93) | 433.10 ^{p<.001} | 7.31 (1.77) | 7.51 (1.81) | 3.96 ^{p=.047} |
| Conduct problems | 3946 | 2.14 (1.56) | 2.00 (1.42) | 2.28 (1.68) | 33.39 ^{p<.001} | 2.44 (1.75) | 2.08 (1.53) | 17.43 ^{p<.001} |
| Hyperactivity problems | 3943 | 4.17 (2.14) | 4.28 (2.15) | 4.05 (2.13) | 11.62 ^{p<.001} | 4.01 (2.26) | 4.16 (2.13) | 1.74 ^{p=.19} |
| Impact score | 3822 | 0.49 (1.27) | 0.64 (1.48) | 0.33 (1.01) | 58.52 ^{p<.001} | 0.43 (1.16) | 0.49 (1.27) | 0.60 ^{p=.44} |
| Musculoskeletal pain | 3720 | 1.47 (1.27) | 1.70 (1.29) | 1.24 (1.20) | 125.48 ^{p<.001} | 1.46 (1.20) | 1.47 (1.27) | 0.03 ^{p=.87} |

Note: Statistical analyses: Chi-square test (χ^2) and One-way ANOVA. NEET data based on national insurance registry data (FD-Trygd). Adolescent problems based on NAAHS data (10th grade).

Table 2 NEET in young adulthood by Sami ethnicity and residency, by gender.

| Factors | NEET | |
|-------------------|-----------------------|------------------------|
| | Females | Males |
| Ethnicity | | |
| Sami | 16.6% | 23.0% |
| Non-Sami | 20.8% | 15.2% |
| Statistical diff. | 1.62 ^{p=.20} | 6.69 ^{p=.010} |
| Residency | | |
| Nordland county | 20.9% | 14.7% |
| Troms County | 22.0% | 17.0% |
| Finnmark county | 18.7% | 20.4% |
| Statistical diff. | 1.31 ^{p=.52} | 5.93 ^{p=.052} |

Note: Statistical analyses: Chi-square test (χ^2). NEET data based on national insurance registry data (FD-Trygd). Adolescent problems based on NAAHS data (10th grade).

Table 3. The prediction of NEET in young adulthood by gender. Unadjusted (only one covariate), by sociodemographic factors and fully adjusted with all the listed covariates included (OR, 95% CI)

| Factors | NEET in young adulthood | | | | | |
|--|--|---------------------------------------|---------------------------------------|--|---------------------------------------|--|
| | Females | | | Males | | |
| | Unadjusted bivariate analyses | Socio-demographic model | Fully adjusted multivariable model | Unadjusted bivariate analyses | Socio-demographic model | Fully adjusted multivariable model |
| For models | – | 0.010 | 0.070 | – | 0.021 | 0.094 |
| Sociodemographic factors | | | | | | |
| Non-Sámi (ref.) | 1 | 1 | 1 | 1 | 1 | 1 |
| Sámi ethnicity | 0.76 (0.50-1.13) ^{p=.17} | 0.76 (0.50-1.16) ^{p=.21} | 0.74 (0.46-1.17) ^{p=.20} | 1.67 (1.15-2.42) ^{p=.008} | 1.59 (1.07-2.36) ^{p=.021} | 1.58 (1.02-2.44) ^{p=.039} |
| Norland county (ref.) | 1 | 1 | 1 | 1 | 1 | 1 |
| Trøndelag County | 1.06 (0.84-1.35) ^{p=.61} | 1.12 (0.87-1.43) ^{p=.39} | 1.13 (0.86-1.48) ^{p=.40} | 1.19 (0.91-1.56) ^{p=.20} | 1.16 (0.87-1.55) ^{p=.31} | 1.18 (0.86-1.62) ^{p=.29} |
| Finmark county | 0.87 (0.62-1.21) ^{p=.41} | 0.93 (0.64-1.34) ^{p=.69} | 1.03 (0.69-1.52) ^{p=.91} | 1.49 (1.07-2.08) ^{p=.018} | 1.25 (0.86-1.81) ^{p=.24} | 1.43 (0.95-2.15) ^{p=.09} |
| Parental higher university degree (ref.) | 1 | 1 | 1 | 1 | 1 | 1 |
| Parental lower university degree | 1.13 (0.71-1.79) ^{p=.60} | 1.02 (0.64-1.64) ^{p=.93} | 1.06 (0.63-1.78) ^{p=.82} | 1.92 (1.09-3.40) ^{p=.025} | 1.76 (0.98-3.14) ^{p=.06} | 1.75 (0.91-3.33) ^{p=.09} |
| Parental upper secondary education | 1.33 (0.85-2.07) ^{p=.21} | 1.26 (0.80-1.98) ^{p=.33} | 1.32 (0.81-2.17) ^{p=.27} | 2.23 (1.28-3.89) ^{p=.005} | 2.04 (1.16-3.58) ^{p=.013} | 2.10 (1.12-3.94) ^{p=.021} |
| Parental lower secondary education | 1.74 (1.06-2.87) ^{p=.030} | 1.72 (1.02-2.87) ^{p=.040} | 2.11 (1.21-3.69) ^{p=.009} | 3.42 (1.84-6.33) ^{p<.001} | 2.91 (1.55-5.46) ^{p=.001} | 3.22 (1.60-6.47) ^{p=.001} |
| Adolescent mental health problems (SDQ) | | | | | | |
| Peer problems | 1.19 (1.11-1.27) ^{p<.001} | – | 1.09 (1.01-1.18) ^{p=.040} | 1.21 (1.13-1.30) ^{p<.001} | – | 1.23 (1.12-1.34) ^{p<.001} |
| Emotional problems | 1.13 (1.08-1.19) ^{p<.001} | – | 1.04 (0.97-1.11) ^{p=.28} | 1.08 (1.01-1.16) ^{p=.018} | – | 0.88 (0.81-0.97) ^{p=.008} |
| Prosocial behavior | 0.97 (0.90-1.04) ^{p=.40} | – | 1.02 (0.94-1.11) ^{p=.67} | 0.97 (0.91-1.04) ^{p=.38} | – | 1.04 (0.96-1.12) ^{p=.33} |
| Conduct problems | 1.19 (1.10-1.28) ^{p<.001} | – | 1.06 (0.96-1.17) ^{p=.29} | 1.25 (1.17-1.33) ^{p<.001} | – | 1.17 (1.07-1.28) ^{p=.001} |
| Hyperactivity problems | 1.15 (1.09-1.21) ^{p<.001} | – | 1.10 (1.03-1.18) ^{p=.004} | 1.13 (1.06-1.19) ^{p<.001} | – | 1.05 (0.98-1.14) ^{p=.17} |
| Impact score | 1.22 (1.14-1.30) ^{p<.001} | – | 1.08 (0.99-1.18) ^{p=.08} | 1.21 (1.09-1.34) ^{p<.001} | – | 1.12 (0.98-1.28) ^{p=.10} |
| Adolescent musculoskeletal pain | 1.24 (1.13-1.35) ^{p<.001} | – | 1.09 (0.98-1.21) ^{p=.10} | 1.22 (1.10-1.35) ^{p<.001} | – | 1.15 (1.03-1.29) ^{p=.017} |

BMJ Open

Not engaged in education, employment or training (NEET) in an Arctic sociocultural context: The NAAHS cohort study

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|---------------------------------|---|
| Journal: | <i>BMJ Open</i> |
| Manuscript ID | bmjopen-2018-023705.R1 |
| Article Type: | Research |
| Date Submitted by the Author: | 11-Dec-2018 |
| Complete List of Authors: | Bania, Elisabeth; NTNU, Department of Mental Health Eckhoff, Christian; University Hospital of North Norway, Child and Adolescent Psychiatry; UiT The Arctic University of Norway, Department of Clinical Medicine Kvernmo, Siv; UiT The Arctic University of Norway, Department of Clinical Medicine; University Hospital of North Norway, Department of Child and Adolescent Psychiatry |
| Primary Subject Heading: | Public health |
| Secondary Subject Heading: | Epidemiology, Health economics, Mental health, Occupational and environmental medicine, Health policy |
| Keywords: | MENTAL HEALTH, PUBLIC HEALTH, HEALTH ECONOMICS, Child & adolescent psychiatry < PSYCHIATRY, SOCIAL MEDICINE |
| | |

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5 Not engaged in education, employment or training (NEET) in an Arctic
6 sociocultural context: The NAAHS cohort study
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36 Running title: Not engaged in education, employment or training (NEET)
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38 Words: 4349
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ABSTRACT

Objectives

The purpose of the study is to explore the prevalence and predictors of NEET-status (Not engaged in education, employment or training) in a multicultural young adult population in Northern Norway.

Design and setting

The longitudinal design link a self-reported survey (2003-2005) with an objective registry linkage follow-up 8-10 years later.

Participants

Of all 5,877 tenth graders (aged 15–16 years) in Northern Norway, 83% of the total age cohort from all 87 municipalities participated in the baseline survey. The follow-up studies consisted of 3,987 consent giving adolescents (68%), were 365 (9.2%) reported indigenous Sami ethnicity.

Outcome measures

Youth not engaged in education, employment or training (NEET) at the age of 23-25 years old.

Methods

Explanatory variables were sociodemographic factors (gender, ethnicity, residency, parental education), mental health problems and musculoskeletal pain in adolescence. Outcome variable characterized as NEET-status was defined by no educational engagement, long-term recipient of sickness benefit, medical and non-medical benefit receipt or long-term unemployment.

Results

NEET-status in young adulthood was significantly higher among females (20.9 %) than among males (16.2%). Ethnic differences occurred as being NEET among Sami males was significantly higher than among non-Sami males, 23.0% and 15.2% respectively. Minority Sami females experienced NEET-status to a lower degree (16.6%) than non-Sami females (20.8%). Among females adolescent peer problems ($OR_{adj}=1.09$) and hyperactivity problems ($OR_{adj}=1.10$) were associated with later NEET-status. Peer problems ($OR_{adj}=1.23$), conduct

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3 problems ($OR_{adj}=1.17$) and musculoskeletal problems ($OR_{adj}=1.15$) in male adolescents were
4 associated with later NEET-status, whereas emotional problems among males predicted
5 significantly less later NEET- status ($OR_{adj}=0.88$).
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8 We found lower parental education to be significantly associated with being NEET-later in
9 young adults (females: $OR_{adj}=2.11$, males: $OR_{adj}=3.22$).
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13 **Conclusions**

14 To address the disengagement of education and work, particular emphasis must be placed on
15 supporting young people struggling with mental and physical health problems.
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22 **Strengths and limitations of this study**

- 23 • The main strength is the linkage of a large population-based study in adolescence
24 (2003-2005) to the National Education Database (NUDB) (2003-2012) and the
25 National Insurance Registry (FD-Trygd) (2003-2012)
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- 28 • The longitudinal design, based on a self-reported baseline survey and objective
29 registry data linkage 8-10 years later, with high response rate, (83% in survey), where
30 68% of the total age cohort gave consent for follow-up, and where 9.2% (survey) are
31 indigenous Sami, and 10% reported Sami ethnicity in follow-up study
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- 34 • The registry data linkage enabled us to follow the educational and work related
35 footprints of young adults over a decade
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- 38 • The cross-sectional self- reported survey by adolescents has a risk of information bias
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- 41 • New concepts as being NEET (not engaged in education, employment or training) can
42 leave out youngsters at risk, and is not a completely objective outcome term
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47 **Key words**

48 NEET-status, young adults, parental education, mental health problems, musculoskeletal pain,
49 indigenous, longitudinal design, public health
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INTRODUCTION

The term NEET refers to young people who have dropped out of education, training or work, and who may not register as unemployed as there is little financial incentive to sign on as unemployed (1). Over time, young people who experience NEET-status are at risk of permanent social exclusion (2). Olsen and colleagues (3) describe the term NEET, and its plural NEETs, as the acronym for "not in education, employment or training". The term NEET was coined by the UK Department for Education in 1999, which uses it for quarterly statistics (4). The age group covered by the UK statistics is from 16 to 18 years of age, but definitions may vary. In Japan, the term NEET is used for people of the broad age range, from 15 to 35 (5). Developed countries and high-income nations describe the disengagement among youth as concerning (6). The phenomenon is explained, understood and named differently with various cultural bound; as Japanese hikikomori, US slacker and the term NEET mostly used in Europe (7, 8).

The NEET term is questioned and criticized (9, 10). Rightly so, new concepts need to be introduced, questioned and developed (5). NEET-status can be seen as a collective term for including youth who are vulnerable (1). The NEET concept can be a useful tool for targeting means of intervention (9, 11). Oliver et al. (12) emphasizes that interventions for engaging people experiencing NEET-status may work well in rural, but not urban areas, during economic growth and not retention, or in conservative but not liberal societies. In other words, a contextual term which can be applied also within the OECD countries (2, 5).

This present study is designed for NEET-status in young Norwegians, including both majority ethnic Norwegians, and indigenous Sami Norwegians. Nordic researchers use the NEET term to describe youth marginalized from employment and education (3). Youth unemployment is of the greatest concern within the OECD (13). However, the OECD focus is

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3 expanded to include those not only not in education and employment but also those not in
4 training with being NEET (14).
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8 Egalitarian Norway is a tax-funded, redistributive welfare state, with universal
9 entitlements and generous contributions for social and financial security (15). The fiscal and
10 ideological policy, with its Work Approach (16), have shown to protect against crime and
11 social injustice (15). However, the negative consequence can be that some young adults
12 choose welfare benefits over employment and work-based income (17, 18). International
13 studies suggest that recipients of social welfare benefits are associated with later work
14 exclusion, or more lack of work inclusion (19, 20). Work is also an important source of social
15 inclusion and affects health in a positive way (21). The individual and the society therefore,
16 have an interest in youth starting adult life in education, employment or in training (1, 7, 8,
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30 Work marginalization can be defined as being on the border of the labour market (10).
31 The person is not fully integrated in, but not permanently excluded from, the labour market
32 (22). In empirical research, the common source of data used to study marginalization has been
33 information on unemployment, long-term absence by sick-leave and social-welfare benefit
34 receipt (1, 23). Normann et al. (22) explained how work marginalization can be viewed from
35 an individual or from a sociocultural perspective, as well as a sociological perspective (20).
36 The work approach as a norm in society, means that most individuals will be integrated into
37 the labour force (23). However, some people may for different reasons, voluntarily choose not
38 to participate in the labour force (15).
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51 In general, individuals with less education or income, and who are unemployed report
52 poorer health (24). Norwegians are in general reported to be in good health, compared with
53 the OECD average; 73 % versus 69 %, respectively (25). In spite of this, Norway has the
54 highest incidence of sickness absence and greatest disability caseload in the OECD (25).
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3 Of all young people in Norway, 6.3% received social welfare benefits within a year
4 and for at least a one-month period. More than 60% of the recipients were single person
5 households (26). According to Statistics Norway the number of social welfare benefit
6 recipients has been stable since 2005 (27). Young males, 18–24 years old, represent the
7 greatest concern, as they make up the majority of the social welfare recipients. Internationally,
8 young women are overrepresented in being NEET-later, which may be caused by teenage
9 pregnancy and young parenthood (28). Concerns regarding NEET-status are triple regardless
10 of gender and reasons: the cost of social welfare benefits, the lack of tax income caused by
11 work exclusion, and the public health issues related to work marginalization and poor health
12 (1).
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26 Minority youth, Sami young people included, are shown to be at higher risk of
27 experiencing work marginalization and possible social exclusion due to non-completion of
28 upper secondary school, lower tertiary education and thereby unemployment and poor health
29 (27, 29-32). Young adults in rural and remote Northern Norway have dropped out of upper
30 secondary school and have higher unemployment rates than their fellow peers in the rest of
31 Norway (27, 31, 33). Young people's engagement for own education and work are influenced
32 by parental education level and socioeconomic status (SES), such as income and job positions
33 (34, 35).
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45 The two most prevalent public health issues, mental health disorders and
46 musculoskeletal pain problems, are costly to the quality of life for young people (36-38), their
47 families (37, 39) and to the society (40-45).
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51 Mental health problems in adolescence and young adulthood have been found to be
52 associated with reduced workforce participation and increased medical welfare benefits such
53 as sick-leave entitlements in young adulthood (46-48). Mood and anxiety disorders are the
54 most prevalent mental health disorders resulting in long-term medical benefits in Norway, and
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3 is also closely related to adolescent musculoskeletal pain (49, 50). Adolescent
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5 musculoskeletal pain has been found to be associated with later medical and social welfare
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7 benefit receipt in young adulthood (51). Studies in adults have shown that multisite pain
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9 predicts long-term medical benefits, both overall (40) and with comorbid mental health
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11 disorders (52). In Norwegians under 40 years of age, continuous sickness benefits of more
12
13 than eight weeks predict later disability pension, especially due to mental health and
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15 musculoskeletal disorders (53). Over the last decades in Norway, an increase in long-term
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17 medical benefit recipients and medical rehabilitation due to mental health disorders are found
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19 in 18–29-year-olds (54, 55).
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24 Research on these issues, especially in youth, can make an important contribution to
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26 public health work. A longitudinal study with emphasis on sociocultural context,
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28 musculoskeletal pain and mental health in adolescence and being NEET-later has to our
29
30 knowledge not been done previously. This study aimed to capture both emotional, relational
31
32 and behavioural problems, as well as musculoskeletal pain. The predictors of experiencing
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34 NEET-later, including social relationships as well as mental- and physical health, has to our
35
36 knowledge not been performed previously in both majority and indigenous young people.
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40 The first aim of this study was to explore the prevalence of young adults not engaged
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42 in education, employment or training (NEET) defined by no educational engagement, long-
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44 term recipient of sickness benefit, medical and non-medical benefit receipt or long-term
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46 unemployment in an unselected population of young people in Arctic Norway.
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49 The second aim was to determine the importance of relevant factors, such as socio-
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51 demographic factors; gender, ethnicity, parents' socioeconomic status by parental education
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53 level, and residency.
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56 The third aim was to explore the prediction of self-reported mental health and
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58 musculoskeletal pain in adolescence on being NEET-later in young adulthood.
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3 We expected that male gender, residency in northernmost and sparsely populated
4 Finnmark County, Sami ethnicity, self-reported mental health problems and musculoskeletal
5 problems would be associated with later NEET-status, in young adulthood, whereas higher
6 parental education, and female gender would act as protective factors.
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14 **METHODS**

15 **Study design**

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17 The Norwegian Arctic Adolescent Health Study (NAAHS) was conducted from
18 January 2003 until January 2005. All tenth grade students in all lower secondary schools in
19 the three northernmost Norwegian counties (n=5,887) were invited to participate in this study.
20 The questionnaires were administered during a 2-hour period in a classroom setting that was
21 monitored by project staff; non-attending pupils completed their questionnaires at a later time.
22 The self-reported survey consisted of several and various questions. The questionnaire was
23 paper based and available in both the Sami and Norwegian languages.
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35 The adolescents provided a written consent for later follow-up studies including
36 linkage to registry data. The adolescents were informed in the written information letter that
37 they could withdraw their consent at any time, and ask for data to be erased, without stating
38 any reason.
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44 Data on upper secondary school were missing for six students, and these were
45 excluded from the study, leaving a working sample of 3,981 students.
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49 The Norwegian data Inspectorate and the school authorities approved the NAAHS
50 study. The Regional Committee for Medical and Health Research Ethics approved the
51 NAAHS study (REK 18/2003) and registry linkage (REK 2012/1381). The Norwegian
52 Institute of Public health and Statistics Norway carried out the registry linkage.
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3 The NAAHS was linked to the National Insurance Registry (FD-Trygd) and the
4 National Education Data Base (NUDB) for the period 2003–2012. The registry databases
5 provide information about each person's medical and social welfare benefits, unemployment
6 and educational achievements up to 23–25 years of age for the study sample, see Figure 1.
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22 **Sample and participants involvement**

23 The participants included 4,881 of the total age cohort of 5,877 (RR 83%) adolescent tenth
24 grade students in lower secondary school (15–16 years of age). The following response rates
25 were observed for the three counties: Finnmark, 71%, Troms, 82% and Nordland, 88%.
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30 Of the respondents included in the sample, 50.1% were females and 49.9% were
31 males. Fourhundredandfifty out of 4881 adolescence reported Sami ethnicity, approximately
32 10% of the sample.
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37 A total of 3,987 (68% of the total age cohort) of the adolescents gave their written
38 consent to later follow-up studies including linkage to registry data, in which 9.2% of the
39 registry sample were indigenous Sami, and 50.1% females and 49.9% males. A flowchart for
40 the study is shown in Figure 2.
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Patient and Public Involvement

Patients and public were not involved in designing the study.

Outcome measures

Not engaged in education, employment or training (NEET) was defined as participants who had not completed tertiary education during the study period and either been registered as 100% unemployed for more than one year, or received six or more months of sickness benefits, or received six or more months of social welfare benefits during a 12-month period, or received medical rehabilitation benefits or disability pension during the entire study period. Data was based on the available data from the National Insurance Registry (FD-Trygd) and the National Education Data Base (NUDB).

Primary predictors

Mental health problems

Strength and Difficulties Questionnaire (SDQ) (56) has a parent, teacher and a youth version. In this study, only the SDQ self-report (SDQ-S) was used. The algorithms in SDQ have problem scales for three broad-spectrum categories of problems: conduct problems, emotional problems, and hyperactivity/attention problems, as well as an impact score related to family, friends, learning situation, and leisure activities.

The SDQ is a brief behavioural screening questionnaire that asks 25 attributes, some positive and others negative. The 25 SDQ items are divided between five scales of five items each, generating scores for conduct problems, hyperactivity-inattention, emotional symptoms, peer problems and prosocial behaviour; all but the last one is summed to generate a total

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3 difficulties score. The extended version of the SDQ includes not just the 25 items on
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5 symptoms and positive attributes but also an impact supplement that asks whether the
6
7 respondent thinks that the child or teenager has a problem, and if so, enquires further about
8
9 overall distress, social impairment, burden and chronicity. All five subscales are used in this
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11 study, as well as the functional impact scale; The Prosocial Behaviour scale (SDQ-prosocial)
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13 ($\alpha=.65$), the Peer Problem Scale (SDQ-peer) ($\alpha=.52$), the Emotional Symptom Scale (SDQ-
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15 emotional) ($\alpha=.70$), the Conduct Problem Scale (SDQ-conduct) ($\alpha=.47$), and the
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Hyperactivity-Inattention Scale (SDQ-hyper) ($\alpha=.64$).

The subscales have five items each with scores from 0 to 2 on each item, indicating; 0= Not correct, 1= Correct sometimes 2= Totally correct. The Prosocial subscale has inverse scores.

The subscale SDQ-Impact scale (SDQ-impact) ($\alpha=.69$) was used, where a score of 10 implies the greatest functional impairment due to mental health problems in home life, friendships, classroom activities and leisure activities. Mean scores operationalized the scales.

Musculoskeletal pain

Musculoskeletal pain was measured by “yes/no” answers to the question from NAAHS: “During the last 12 months have you often been troubled by pain in the head, neck/shoulder, arms/legs/knees, abdomen or back?” Abdominal pain was excluded due to the potential confusion with menstrual pain. Headache was included based on its frequent co-existence with musculoskeletal pain and their shared mechanisms and risk factors (57). The question results in a variable ranging from zero to four pain sites.

Explanatory factors from the NAAHS study

Gender. Female gender as the reference group.

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3 *Residency* refers to the county where the adolescent lived during lower secondary
4 school. The three northernmost counties in Norway were compared: Nordland, Troms and
5 Finnmark, of which Finnmark is the northernmost, as well as the most remote and most
6 sparsely populated county. Nordland county, the southernmost, has the highest number of
7 inhabitants, and is used as the reference group.
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14 *Sami ethnicity* was measured by an assessment of parents' ethnicity, Sami language
15 competence in parents, grandparents and the participants, and ethnic self-identification.
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17 Participants who had one or more of these affiliations present were classified as having Sami
18 ethnicity (58). Non-Sami ethnicity was used as the reference group.
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24 Parental socioeconomic status was measured by *parental education level*: parents'
25 highest education was obtained from Statistics Norway's education registry, registered when
26 the participants were 15–16 years old. Parental education was categorized from 'lower
27 secondary' (≤ 10 th grade), 'upper secondary' (≤ 13 th grade), 'lower university degree' (up to
28 5 years) to 'higher university degree' (5 years or more) (59). Parental higher university degree
29 was used as the reference group.
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40 **Data analysis**

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42 Groups were compared using Pearson's chi squared test for categorical data, and one-way
43 ANOVA for continuous data. Logistic regression was used for the multivariable analyses for
44 the association with later NEET-status, stratified by gender. Based on a 10% outcome rate in
45 a non-exposed group then the following odds ratios (OR) should be considered as small
46 (OR=1.46), medium (OR=2.50) and large (OR=4.14) effect sizes (60). Evaluation of the
47 multivariable models explained variance was done by Cohen's criteria (R^2): 2-13% is small,
48 13-26% is medium and $\geq 26\%$ is large (61). Two-sided p-values < 0.05 are taken to indicate
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3 statistical significance. Due to multiple hypotheses, p-values between 0.01 and 0.05 should be
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5 interpreted with caution.
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7 We also examined for interaction terms between gender, residency and adolescent problems,
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9 as well as Sami ethnicity, residency and adolescent problems. SPSS 22 was used for all
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11 analyses and the statistical significance level was set to .05.
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17 RESULTS

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19 NEET-status in young adulthood was significantly higher among females (20.9 %)
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21 than among males (16.2%) (Table 1). Ethnic differences occurred as being NEET among
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23 Sami males was significantly higher than among non-Sami males, 23.0% and 15.2%
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25 respectively (Table 2). Sami females experienced NEET-status to a lower degree (16.6%)
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27 than non-Sami females (20.8%). The difference was however, not statistically significant for
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29 females (Table 2).
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33 A strong geographical trend occurred between young males from the counties of
34
35 Nordland, Troms and Finnmark. Males from the northernmost Finnmark county showed a
36
37 higher rate of experiencing NEET-status ($p=.052$) than among male counterparts from
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39 Nordland and Troms counties (Table 2). This geographical trend was not found among
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41 females. Parental education and later NEET-status among females was nearly significant
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43 ($p=.053$), whilst the association was highly significant among males (Table 2).
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53 (Insert Tables 1 and 2 about here)
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3 The multivariable analyses of the association between sociodemographic factors, adolescent
4 mental health problems, adolescent musculoskeletal pain and being NEET-later are presented
5 in Table 3. Participants with parents with a lower secondary education level had a
6 significantly higher risk of experiencing NEET-status at all analytical levels for both genders,
7 compared to participants with parents with a higher university degree. Male participants with
8 parents with upper secondary education level showed a similar association on all analytical
9 levels of significantly higher NEET-status, compared with male participants with parents with
10 a higher university degree (Table 3).
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21 Among the sociodemographic variables, Sami ethnicity was a significant predictor for
22 more NEET-status in males, but non-significant for being categorized as NEETs later in
23 females (Table 3). In both genders the sociodemographic variables alone accounted for a
24 small percentage of the explained variance (between 1–2%) of later NEET-status.
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30 For both males and females, the explained variance increased with 6–7.3% when
31 adolescent mental health and musculoskeletal pain were included in the model. In the
32 unadjusted analyses, all types of mental health behaviour, except for prosocial behaviour,
33 were significantly associated with being NEET-later for both genders. In both genders, peer
34 problems were a significant predictor of NEET-status both in the unadjusted and fully
35 adjusted analyses. However, in the fully adjusted model the impact of the other mental health
36 problems on experiencing NEET- status differed between males and females. In females,
37 hyperactivity was the only remaining significant predictor of later NEET-status, while in
38 males conduct problems and musculoskeletal problems were associated with being NEET
39 later. Males who reported more emotional problems experienced significantly less NEET-
40 status when controlled for all other predictors. Prosocial behaviour and daily functioning
41 (SDQ impact) was not associated with later NEET status for any gender.
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3 We found no significant interactions for later NEET-status for either Sami ethnicity
4 and residency, or gender and residency by the adolescent problems at the .05 level.
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17 **DISCUSSION**

18 **Main findings**

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20 In this study mental health problems and musculoskeletal pain in adolescence were associated
21 with experiencing being NEET-later. Lower parental education was found to be significantly
22 associated with NEET-status in young adulthood. The predictive effect of gender for being
23 NEET later were minor in this study, although female NEET-status was significantly higher
24 than among males. Ethnic differences occurred as being NEET among Sami males was
25 significantly higher than among non-Sami males, while Sami females experienced NEET-
26 status to a lower degree than majority female peers.
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41 **Methodological strengths and limitations**

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43 The main strength of this study is the linkage of an unselected population-based study with a
44 high response rate to registry data, enabling analyses of predictors of later NEET. The study
45 had an equal gender distribution and a high participation rate, and Indigenous Sami were
46 represented almost equally in the survey and in the consent-based follow-up study. The
47 NAAHS participants not consenting registry linkage did not differ in sociodemographics or
48 mental health from the linkage participants, thereby strengthening its generalizability (62).
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50 The longitudinal study linked cross-sectional adolescent self-reported data of a broad specter
51 of predictors (socioeconomic status, sociocultural factors, daily functioning, mental and
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3 physical health) among 15-16 year old adolescents and NEET-status among 23-25 year old
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5 young people (8-10 years after survey).
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8 Reliability and validity of brief scales, such as the SDQ, can be questioned also in this
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10 study (63). Cronbach's alpha was applied as a measure of internal consistency reliability, with
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12 a value of .70 or more considered reliable. The Emotional Symptoms Scale (SDQ-emotions),
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14 the Prosocial Behaviour Scale (SDQ-prosocial), the SDQ-Impact Scale (SDQ-impact) and,
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16 the Hyperactivity Scale (SDQ-hyper) could be considered reliable, while the Conduct
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18 Problems (SDQ-conduct) and Peer Problem Scales (SDQ-Peer) had a lower value, which can
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20 question the validity of these scales. SDQ-peer as a psychometric tool is also questioned for
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22 certain ethnic groups of children due to the lack of sociocultural sensitivity. Williamson et al.
23
24 (64) exemplifies the poor fit by the lack of questions of connection to extended family, ethnic
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26 identity and the impact and experience of racism. The results for peer problems in this study
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28 should therefore be interpreted with caution.
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33 In this registry-linked study we were limited to only one cross-sectional study and the
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35 findings in this study are assumed to be influenced by other or more present explanatory
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37 factors, reflected by the relatively lower explained variances for later NEET. The explained
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39 variance of the multivariable models might be considered to be low; however, explained
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41 variance is a relative value, dependent on the nature of the associations examined. In
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43 outcomes with multiple determinants, the size of the explained variance is limited by nature.
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47 The survey was answered during school time, and in a classroom setting. The cluster
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49 effect may influence the responses given.
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52 The concept of being NEET is questioned (10), and has limitations (9). However,
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54 NEET-status is a tool with an outcome of primary interest, which will include changes in
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56 objective status. A transition from NEET-status to non-NEET-status, is a change from
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3 disengagement to engagement (12) which can have important implications for young people's
4 quality of life and health (1, 21).
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10 **Interpretation of the results and comparison to previous findings**

11 To our knowledge, this study is the first longitudinal study to explore the prediction of
12 adolescent musculoskeletal pain and mental health problems on being NEET in young
13 adulthood in a representative sample of indigenous and non-indigenous people in the Arctic.
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19 The proportion of participants who were classified with NEET-status in young
20 adulthood was high, at 18.6%. In spite of a high living standard Norway has a high incidence
21 of sickness absence and disability caseload in the OECD (25). Eckhoff et al. (51) found that
22 17.2% of the participants in the NAAHS study had received any level of social welfare
23 benefits during the entire study period of up to 10 years. The large number of recipients
24 among a cohort of young people is worrying. The foundation of a sustainable welfare society
25 is its working force (15, 16). Female NEET-experience in this study was found to be
26 significantly higher than male NEET-experience. This is in accordance with numbers from
27 OECD (28). However, female NEET-status within the OECD is associated with teenage
28 pregnancy and young parenthood (65). Norway has a low prevalence of teenage pregnancy
29 and has means related to bringing young mothers into education and work, both through
30 student loans, social housing, social entitlements, kindergartens and benefits for young single
31 mothers and young parents (15, 27). There could be other explanations for the higher
32 proportions of female NEET-status, as national statistics show that young females report
33 difficulties in living conditions such as loneliness, inactive lifestyle, and mental health
34 problems (26).
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55 Several studies have shown that females in ethnic minorities and Indigenous people
56 experience poorer health and NEET-status to a larger extent than their majority peers (32, 66).
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3 Our study, however, did not in general confirm such findings as Sami females were less likely
4 than majority peers to experience NEET-status in young adulthood. Recent studies among the
5 NAAHS cohort show that the indigenous Sami youth do not differ much from their majority
6 peers in completing upper secondary school (31), and that Sami minority young people
7 complete tertiary education equally as much, or more, than majority Norwegians (30). In this
8 study Sami males however, significantly experienced more NEET-status in young adulthood.
9 This supports earlier findings of lower educational aspirations (29), and higher drop-out rates
10 from upper secondary school in Sami young males than in majority male peers (31). As
11 education is an important key factor for good health and work inclusion (32) this risk position
12 of indigenous Sami males in Arctic Norway is concerning.
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26 The finding that lower levels of parental education and peer problems in adolescence
27 across gender were associated with later NEET-status in young adulthood indicate the
28 importance of relational and environmental conditions on young peoples' education and work
29 marginalization (10), as well as alienation from community and authority (2). Garg et al. (67)
30 suggested that family background predicts educational aspirations with respect to academic
31 self-concept, as highly educated parents can influence their children when it comes to higher
32 education, and thereby prevent NEET-experience. Several studies suggest how employment-
33 rich networks and community-based neighbourhood influences young people's access to
34 work, income, health and well-being (10, 68)
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47 The findings that peer problems and hyperactivity in females were associated with
48 being NEET-later, is supported by previous findings in the NAAHS study among young
49 females when it comes to high school dropout (31) and partly for tertiary education (30).
50 Myklestad et al. (69) suggest that poor mental health contributes to high school dropout or
51 lower educational achievement (30, 31), and later work marginalization by disability pension
52 (70). SDQ's hyperactivity scale used in this study also includes attention problems, which are
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3 shown to cause cognitive problems in school (71). The effect of poor mental health on
4 educational achievement, but also work marginalization was also shown for males in this
5 study, as adolescent conduct problems and musculoskeletal pain were found to be associated
6 with later NEET-status in males. However, the findings that male emotional problems were
7 significantly associated with less NEET-status later support similar findings among females
8 with emotional problems, who dropped less out of upper-secondary school (31) compared to
9 other female peers. Breslau et al. (72) suggest the mechanisms of internalizing symptoms or
10 emotional problems, might not influence the ability to complete education, and thereby
11 training or work. It is reasonable to assume that structured activities as education and
12 employment can be completed in spite of experiencing mood, depression, or anxiety
13 problems.
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31 CONCLUSIONS

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33 Young people whose parents had lower educational status and those with disturbed
34 peer relations were at greater risk of NEET-status. Mental health problems and
35 musculoskeletal pain in adolescence were associated with later NEET-status. Gender
36 differences in predictors for experiencing NEET-later were minor in this study, although
37 female NEET-status was significantly higher than among males. Sami ethnicity was a
38 significant predictor for more NEET-status in males, but non-significant for being categorized
39 as NEETs later in females. Particular emphasis must be placed on supporting young people
40 struggling with mental and physical health problems to avoid later NEET-status. Targeted
41 means can be effective, helping young adults achieve desirable education and thereby work,
42 income, health and well-being. Social policy measures have to be diversified, tackling
43 different issues along the pathway to employment and paying attention to vulnerable groups,
44 to enable young people education, work and income.
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Contributors

EVB has contributed to the concept and design of the study, the acquisition of registry data, analysis and interpretation of data, drafting and revising the manuscript.

CE has contributed in the analysis and interpretation of data, critical review and revision of the manuscript.

SK has been the project manager of the Norwegian Arctic Adolescent Health Study, being responsible for the content of the questionnaire and the data collection. SK has supervised all processes of drafting the manuscript, in the interpretation of data and in revising the manuscript.

All authors have read and approved the final manuscript.

Funding

The work was funded by the SpareBank 1 Nord-Norge Donations Fund and the Sami Norwegian National Advisory Unit on Mental Health and Substance Use (SANKS), in addition to the Department of Clinical Medicine, University of Tromsøe, The Arctic University of Norway as well as Regional Centre for Child and Youth Mental Health and Child Welfare (RKBU Central Norway), Department of Mental Health,, Faculty of Medicine and Health Sciences, NTNU. The researchers were independent of the funding bodies.

Competing interests

None declared

Ethics approval

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3 The study was approved by the Regional Committee for Medical and Health Research Ethics,
4 reference number 18/2003 and 2012/1381. The adolescents had to provide written consent for
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6 later follow-up studies including linkage to registry data, and their parents were given written
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8 information about the study. The adolescents were informed in the written information letter
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10 that they could withdraw their consent at any time, and ask for data to be erased, without
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12 stating any reason.
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21 **Provenance and peer review**

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23 Not commissioned; externally peer reviewed
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28 **Data sharing statement**

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30 This epidemiological study is based on data not traceable to individuals. Registry data was
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32 erased by 31.12.2017.
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35 No additional data are available
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Table 1 Sample characteristics of NEET-status in young adulthood and adolescent psychosocial problems and musculoskeletal pain.

| Factors | <i>N</i> | Total sample <i>N</i> =3987 | Females <i>N</i> =1991 | Males <i>N</i> =1996 | Gender difference | Sami <i>n</i> =365 | Non-Sami <i>N</i> =3280 | Ethnic difference |
|--------------------------------------|----------|--------------------------------|---------------------------|-------------------------|-----------------------------|-----------------------|----------------------------|-----------------------------|
| | | % | % | % | | % | % | |
| NEET-status | 3987 | 18.6% | 20.9% | 16.2% | 14.32 ^{p<.001} | 19.7% | 18.0% | 0.51 ^{p=.47} |
| Ethnicity | | | | | | | | |
| Sami | 365 | 9.2% | 9.4 % | 8.9% | 0.11 ^{p=.75} | | | |
| Residency | | | | | 1.83 ^{p=.40} | | | 290.66 ^{p<.001} |
| Nordland county | 2104 | 52.8% | 51.9% | 53.7% | | 24.4% | 55.9% | |
| Troms County | 1310 | 32.9% | 33.9% | 31.9% | | 32.6% | 32.8% | |
| Finmark county | 573 | 14.4% | 14.3% | 14.5% | | 43.0% | 11.3% | |
| Self-reported adolescent problems | | Mean (<i>SD</i>) | Mean (<i>SD</i>) | Mean (<i>SD</i>) | | Mean (<i>SD</i>) | Mean (<i>SD</i>) | |
| Mental health (SDQ) | | | | | | | | |
| Peer problems | 3944 | 1.84 (1.59) | 1.77 (1.60) | 1.91 (1.58) | 7.45 ^{p=.006} | 2.05 (1.65) | 1.81 (1.59) | 7.47 ^{p=.006} |
| Emotional problems | 3944 | 2.57 (2.20) | 3.45 (2.26) | 1.69 (1.73) | 755.23 ^{p<.001} | 2.52 (2.05) | 2.58 (2.22) | 0.24 ^{p=.62} |
| Prosocial behaviour | 3946 | 7.47 (1.82) | 8.04 (1.49) | 6.90 (1.93) | 433.10 ^{p<.001} | 7.31 (1.77) | 7.51 (1.81) | 3.96 ^{p=.047} |
| Conduct problems | 3946 | 2.14 (1.56) | 2.00 (1.42) | 2.28 (1.68) | 33.39 ^{p<.001} | 2.44 (1.75) | 2.08 (1.53) | 17.43 ^{p<.001} |
| Hyperactivity problems | 3943 | 4.17 (2.14) | 4.28 (2.15) | 4.05 (2.13) | 11.62 ^{p<.001} | 4.01 (2.26) | 4.16 (2.13) | 1.74 ^{p=.19} |
| Impact score | 3822 | 0.49 (1.27) | 0.64 (1.48) | .33 (1.01) | 58.52 ^{p<.001} | 0.43 (1.16) | .49 (1.27) | 0.60 ^{p=.44} |
| Musculoskeletal pain | 3720 | 1.47 (1.27) | 1.70 (1.29) | 1.24 (1.20) | 125.48 ^{p<.001} | 1.46(1.20) | 1.47 (1.27) | 0.03 ^{p=.87} |

Note: Statistical analyses: Chi-square test (χ^2) and One-way ANOVA. NEET-status data based on National Insurance Registry data (FD-Trygd). Adolescent problems based on NAAHS data (10th grade).

Table 2 NEET-status in young adulthood by Sami ethnicity, residency, parental education by gender.

| Factors | NEET-status | |
|------------------------------------|------------------------|----------------------------|
| | Females | Males |
| Ethnicity | | |
| Sami | 16.6% | 23.0% |
| Non-Sami | 20.8% | 15.2% |
| Statistical diff. | 1.62 ^{p=.20} | 6.69 ^{p=.010} |
| Residency | | |
| Nordland county | 20.9% | 14.7% |
| Troms County | 22.0% | 17.0% |
| Finnmark county | 18.7% | 20.4% |
| Statistical diff. | 1.31 ^{p=.52} | 5.93 ^{p=.052} |
| Parental education | | |
| Parental higher university degree | 17.1% | 8.4% |
| Parental lower university degree | 18.9% | 15.0% |
| Parental upper secondary education | 21.5% | 17.0% |
| Parental lower secondary education | 26.4% | 23.8% |
| Statistical diff. | 7.70 ^{p=.053} | 18.11 ^{p<.001} |

Note: Statistical analyses: Chi-square test (χ^2). NEET-status data based on National Insurance Registry data (FD-trygd).

Table 3 The prediction of NEET-status in young adulthood by gender. Unadjusted (only one covariate), by sociodemographic factors and fully adjusted with all the listed covariates included (OR, 95% CI)

| Factors | NEET-status in young adulthood | | | | | |
|--|--|---------------------------------------|---------------------------------------|--|---------------------------------------|--|
| | Females | | | Males | | |
| | Unadjusted bivariate analyses | Socio-demographic model | Fully adjusted multivariable model | Unadjusted bivariate analyses | Socio-demographic model | Fully adjusted multivariable model |
| R^2 for models | – | 0.010 | 0.070 | – | 0.021 | 0.094 |
| Sociodemographic factors | | | | | | |
| Non-Sami (ref.) | 1 | 1 | 1 | 1 | 1 | 1 |
| Sami ethnicity | 0.76 (0.50-1.13) ^{p=.17} | 0.76 (0.50-1.16) ^{p=.21} | 0.74 (0.46-1.17) ^{p=.20} | 1.67 (1.15-2.42) ^{p=.008} | 1.59 (1.07-2.36) ^{p=.021} | 1.58 (1.02-2.44) ^{p=.039} |
| Nordland county (ref.) | 1 | 1 | 1 | 1 | 1 | 1 |
| Troms County | 1.06 (0.84-1.35) ^{p=.61} | 1.12 (0.87-1.43) ^{p=.39} | 1.13 (0.86-1.48) ^{p=.40} | 1.19 (0.91-1.56) ^{p=.20} | 1.16 (0.87-1.55) ^{p=.31} | 1.18 (0.86-1.62) ^{p=.29} |
| Finnmark county | 0.87 (0.62-1.21) ^{p=.41} | 0.93 (0.64-1.34) ^{p=.69} | 1.03 (0.69-1.52) ^{p=.91} | 1.49 (1.07-2.08) ^{p=.018} | 1.25 (0.86-1.81) ^{p=.24} | 1.43 (0.95-2.15) ^{p=.09} |
| Parental higher university degree (ref.) | 1 | 1 | 1 | 1 | 1 | 1 |
| Parental lower university degree | 1.13 (0.71-1.79) ^{p=.60} | 1.02 (0.64-1.64) ^{p=.93} | 1.06 (0.63-1.78) ^{p=.82} | 1.92 (1.09-3.40) ^{p=.025} | 1.76 (0.98-3.14) ^{p=.06} | 1.75 (0.91-3.33) ^{p=.09} |
| Parental upper secondary education | 1.33 (0.85-2.07) ^{p=.21} | 1.26 (0.80-1.98) ^{p=.33} | 1.32 (0.81-2.17) ^{p=.27} | 2.23 (1.28-3.89) ^{p=.005} | 2.04 (1.16-3.58) ^{p=.013} | 2.10 (1.12-3.94) ^{p=.021} |
| Parental lower secondary education | 1.74 (1.06-2.87) ^{p=.030} | 1.72 (1.02-2.87) ^{p=.040} | 2.11 (1.21-3.69) ^{p=.009} | 3.42 (1.84-6.33) ^{p<.001} | 2.91 (1.55-5.46) ^{p=.001} | 3.22 (1.60-6.47) ^{p=.001} |
| Adolescent mental health problems (SDQ) | | | | | | |
| Peer problems | 1.19 (1.11-1.27) ^{p<.001} | – | 1.09 (1.01-1.18) ^{p=.040} | 1.21 (1.13-1.30) ^{p<.001} | – | 1.23 (1.12-1.34) ^{p<.001} |
| Emotional problems | 1.13 (1.08-1.19) ^{p<.001} | – | 1.04 (0.97-1.11) ^{p=.28} | 1.08 (1.01-1.16) ^{p=.018} | – | 0.88 (0.81-0.97) ^{p=.008} |
| Prosocial behavior | 0.97 (0.90-1.04) ^{p=.40} | – | 1.02 (0.94-1.11) ^{p=.67} | 0.97 (0.91-1.04) ^{p=.38} | – | 1.04 (0.96-1.12) ^{p=.33} |
| Conduct problems | 1.19 (1.10-1.28) ^{p<.001} | – | 1.06 (0.96-1.17) ^{p=.29} | 1.25 (1.17-1.33) ^{p<.001} | – | 1.17 (1.07-1.28) ^{p=.001} |
| Hyperactivity problems | 1.15 (1.09-1.21) ^{p<.001} | – | 1.10 (1.03-1.18) ^{p=.004} | 1.13 (1.06-1.19) ^{p<.001} | – | 1.05 (0.98-1.14) ^{p=.17} |
| Impact score | 1.22 (1.14-1.30) ^{p<.001} | – | 1.08 (0.99-1.18) ^{p=.08} | 1.21 (1.09-1.34) ^{p<.001} | – | 1.12 (0.98-1.28) ^{p=.10} |
| Adolescent musculoskeletal pain | 1.24 (1.13-1.35) ^{p<.001} | – | 1.09 (0.98-1.21) ^{p=.10} | 1.22 (1.10-1.35) ^{p<.001} | – | 1.15 (1.03-1.29) ^{p=.017} |

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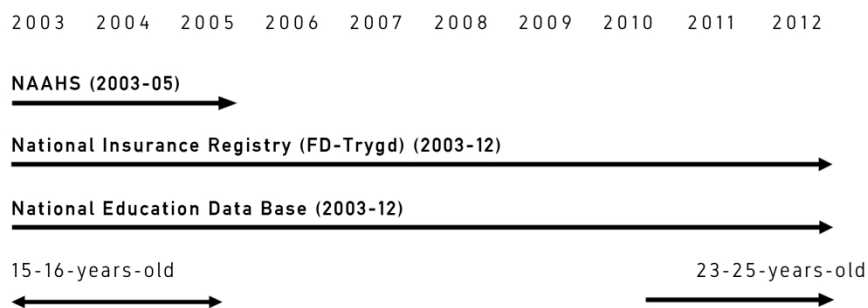
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Figure 1 Study timeline

Figure 2 Flowchart for the study

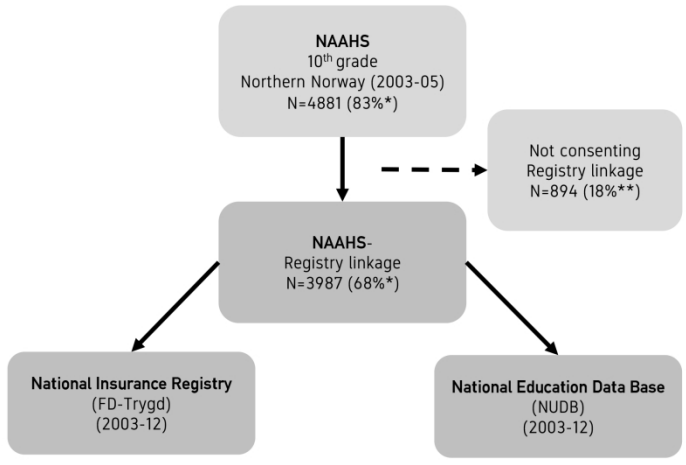
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Figure 1 Study timeline



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Figure 2 Flowchart for the study (*of the total population, **of NAAHS participants)



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