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Adolescents' mental health and subsequent receipt of medical benefits in young adulthood: the mediating role of upper secondary school completion

Abstract:

Background: Mental health problems in adolescence are associated with impaired function in young adulthood. Our aim was to assess how a hypothetical reduction in mental health problems in adolescence was related to medical benefits in young adulthood, and to examine the mediating role of completion of upper secondary school. *Methods:* A population-based sample of more than 10 000 10th graders with self-reported data on internalizing and externalizing mental health problems linked to the Norwegian national registers of education and medical benefits. The mediation analysis was based on a causal inference framework. *Results:* During a three-year period in young adulthood, 6.4% of men and 5.9% of women received medical benefits. A two-point hypothetical reduction in externalizing problems was related to 1.5 [95% confidence interval (CI), 1.0-2.1] percentage points lower probability of receiving medical benefits in young men, 1.8 (95%CI;1.3-2.3) percentage points in young women. The proportion mediated by completion of upper secondary school was 52% (95%CI, 36-76) among boys and 42% (95%CI; 29-60) among girls. The corresponding reduction in the probability of receiving medical benefits was 1.8 percentage points for internalizing problems in both genders (95%CI; boys 1.2-2.4 and girls 1.4-2.2). The proportion mediated was lower for internalizing problems and only significant among girls (19%). *Conclusion:* Intervention and prevention strategies targeting internalizing and externalizing problems in youth may have the potential to reduce the receipt of medical benefits in young adulthood. Completion of upper secondary school seems to be a mechanism for this association, especially for externalizing problems.

Keywords

Mental health, Medical benefits, Longitudinal studies, Mediation

Introduction

Lack of work integration among young adults is a major concern in most Western countries [1]. The lack of participation may be due unemployment (absence of work despite being able to work), ill health or other factors. In Norway, the unemployment rate is low, but the proportion of young adults receiving medical benefits is worrying [2]. School drop-out is prevalent [3], and is a risk factor for welfare dependency [4]. Mental health problems are a major contributor to health related disability in children and youth [5, 6], and mental health problems in adolescence are risk factors for school drop-out [3, 7-10]. Most mental disorders in adults begin during youth, although they are often first detected later in life [11]. Even when children and adolescents with a mental disorder have no subsequent adult disorder they are at increased risk of adverse adult outcomes, such as impaired adult health, education, income, social and family function [12, 13]. Also, children with less severe problems who do not meet criteria for a psychiatric disorder, have increased risk of adverse outcomes [13]. The probability of young people returning to employment after receiving health-related benefits in their early years is low [2, 4], thus they are in danger of social exclusion and marginalisation. Therefore, studying mechanisms and identifying possible factors that may be targets for prevention aiming to reduce the receipt of medical benefits in young adulthood are important, both from a socio-economic and from an individual perspective.

We made use of a large population-based sample of more than 10 000 10th graders with self-reported survey data on internalizing and externalizing mental health problems. With a link to registers of school dropout and medical benefits, we were in a position to analyse adolescents' mental health and subsequent receipt of medical benefits in young adulthood, focusing on the mediating role of completion of upper secondary school. Using a causal inference framework, our aim was to investigate whether a hypothetical reduction in mental health symptoms in adolescence changed the probability of receiving medical benefits in young adulthood, and to examine how much of the effect that was mediated by the completion of upper secondary school.

Methods

Study population

This study was based on a large, comprehensive survey of all 10th graders (aged 15–16 years) in three Norwegian counties and Tromsø town that were linked to the high-quality National Insurance Administration Registers. The Norwegian Institute of Public Health conducted these health surveys between 1999 and 2002 [14]. A detailed description of the study is provided elsewhere [7]. The overall response rate for the questionnaire studies was 88% (N=13 377, n=11 744). Of the participants in the baseline studies, 90% (n=10 583) accepted the linkage of information between the survey and official registers. Thus, the study population contained 79% of those invited in the baseline studies.

During the study period (from the start of the year in which they completed the 10th grade to the end of the year in which they turned 24), 449 individuals emigrated or died, and were therefore excluded from the final analysis.

Measures

Outcome measure – medical benefits. The outcome variable “medical benefits” was based on registry data from the National Insurance Administration Registers (FD-Trygd). Residents of Norway are all insured by the National Insurance Scheme. Adults with a history of an impairing illness or a long-standing reduced ability to work could, up until March 2010, receive either medical or vocational rehabilitation benefits with the aim of restoring their ability to work. If their condition was severe and impaired their working capacity by 50% or more, they could be granted a temporary disability benefit. From March 2010, these three benefits were collapsed into a single benefit, which was used as the outcome “medical benefits” in the current paper. Participants receiving any of these three benefits from the calendar year in which they turned 22 and the two subsequent years (throughout the year in which they turned 24) were categorized as receiving medical benefits.

A permanent disability pension can also be granted if the condition is severe with a poor prognosis and if the working capacity is reduced by 50% or more. Individuals who received permanent disability pension (n=25) were excluded from the analyses, because the majority of young people on a disability pension have a severe physical or mental disability from birth [15].

Mediating variable – non-completion of upper secondary school. Information on the completion of upper secondary school was provided by Statistics Norway. In accordance with Statistics Norway, we defined non-completers as individuals who did not complete upper secondary education within 5 years after completing the 10th grade (i.e., by the year in which they turned 21). In Norway, the right to free public education is available for 13 years, of which 10 are compulsory. After completing compulsory education up to the 10th grade at 15–16 years of age, about 98% of students in Norway continue on to upper secondary school [16].

Main exposure – mental health at age 15–16 years. Mental health problems were assessed by the self-report version of the Strengths and Difficulties Questionnaire (SDQ). The SDQ is a 25-item questionnaire with five subscales, each consisting of five items, generating scores for emotional symptoms, conduct problems, hyperactivity–inattention, peer problems and prosocial behaviour. There is theoretical and empirical support for combining the SDQ’s emotional and peer subscales into an ‘internalizing’ subscale and the conduct problems and hyperactivity subscales into an ‘externalizing’ subscale [17]. Cronbach’s alpha was 0.69 for the internalizing subscale and 0.68 for the externalizing subscale. The internalizing and externalizing subscales are coded from 0 to 20, with higher scores representing more problems.

Adjustment variables – socio-demographic factors. The three counties were Oppland (conducted during the school year 2001/2002, n=1754), Hedmark (2000/2001, n=1787) and Oslo (2000/2001 and 1999/2000, n=6555), in addition to Tromsø town (2001/2002, n=487).

Statistics Norway's definition of ethnic minorities, i.e. those having both parents born in a country other than Norway, was applied [18]. Information about parents' country of birth was provided by register data from Statistics Norway. About 16% of the study population had an ethnic minority background.

Mother's and father's education when the participants were 16 years of age was used to identify "parents' education". Information was provided by Statistics Norway's register of education, and the highest level of education accomplished by the parents was used. In the analyses, parents' education was categorized as "compulsory education (<10th grade/lower secondary)", "intermediate education (upper secondary)", "tertiary education (university, up to five years)" and "tertiary education, (longer university degree)" [19].

Mother's and father's income when the participants were 16 years of age was provided by Statistics Norway's register of income. The mother's and father's incomes [20] were categorized as "high" (above the 75th percentile), "medium" (25th to 75th percentile), or "low" (below the 25th percentile) in the descriptive table. In the mediation analyses, income was entered as a continuous variable, with Winsorization of values above 2.5 million NOK (replacing values above this income by 2.5 million NOK, approximately 450 000 USD) because of a highly skewed distribution.

Statistics

All analyses were stratified by gender. To describe the distribution of the background factors, cross-tab analysis with chi-square tests were performed. This analysis was also used to describe the non-completion rates and the use of health-related benefits in these strata. Chi-square analyses were performed to compare prevalence rates between groups. We used the Student's *t* test to compare the SDQ scores among those completing/not completing upper secondary school and those receiving/not receiving medical benefits.

Causal mediation analysis [21, 22] with non-completion of upper secondary school as the mediator, was used to study the direct and indirect effects of internalizing and externalizing problems on receiving medical benefits (Figure 1). Indirect effects were the effects mediated via non-completion, and direct effects were the effects not mediated. Direct and indirect effects were estimated for a hypothetical two-point decrease in SDQ score. A two-point difference in the SDQ scales is about two-thirds of the standard deviations (SD), and corresponds to 10% of the range. A difference of about 10 points on a 0–100 scale is often considered noticeable in a quality-of-life scale [23]. The SDQ Total score is found to be a genuinely dimensional measure of child mental health with no evidence of threshold effects [24]. To make sure that the possible effects estimated were relevant for a considerable proportion of the sample, the intervals tested were chosen within the 'main range' of the respective distributions, avoiding the tails. These intervals were between the 50th and 75th percentiles. More specifically, a difference between 6 and 4 for internalizing problems and

between 8 and 6 for externalizing problems were studied. To see if the estimated effect of the hypothetical change in the SDQ scores were sensitive to the specific intervals chosen, we also investigated the effects of a two-point hypothetical change between 8 and 6 (internalizing) and 10 and 8 (externalizing). The effect measure was the change in the probability of receiving medical benefits. We tested two models in the mediation analyses. In the primary analyses (model 1) we adjusted for socio-demographic factors, and in secondary analyses (model 2) we also adjusted for externalizing problems when studying internalizing problems (and vice versa). We have placed the main emphasis on estimates from model 1, where the two mental health scales were not controlled for each other (see Methodological strengths and limitations in the Discussion section below).

In the descriptive analyses, SPSS 18 (SPSS Inc., Chicago, IL, USA) was used. The mediation analyses used R version 3.1.1 (The R Foundation for Statistical Computing, Vienna, Austria), with the R package mediation (4.4.3)[21] for causal inference/mediation analysis.

Results

In our study population, 6.4% of the young men and 5.8% of the young women received medical benefits between 22–24 years of age. The percentage varied with county/town of residence and parents’ education and income. Among young men, the percentage of medical benefits also varied with ethnic background (Table 1).

----- Table 1 about here-----

Young men and women receiving medical benefits reported more externalizing and internalizing problems in the 10th grade than those not receiving such benefits (Table 2). The proportion completing upper secondary school was 65.5% among the boys and 77.8% among the girls. Those not completing upper secondary school reported more externalizing and internalizing problems than the corresponding groups who completed upper secondary school (Table 2).

Of the boys not completing upper secondary school, 15.1% received medical benefits between 22–24 years of age. This is 8.3 times more than the boys who completed upper secondary school (1.8%). Of the girls not completing upper secondary school, 15.9% received medical benefits, 5.3 times more than the girls who completed upper secondary school (3.0%).

-----Table 2 and 3 about here-----

Mediation analysis

In the causal mediation analysis in boys, we found that a hypothetical two-point decrease in externalizing problems (from 8 to 6) in the proposed model gave a 1.5 percentage points reduction in the probability of receiving medical benefits between the ages of 22–24 years after adjustment for socio-demographic factors (Table 3, model 1). Of this total effect, 52.3%

was mediated by completion of upper secondary school. In girls, the corresponding figures were 1.8 percentage points and 42.3%, respectively (Table 3, model 1).

When adjusting for internalizing problems (model 2), the total effect of externalizing problems decreased somewhat, and the proportion mediated increased in both genders (Table 3, model 2).

Studying internalizing problems, a hypothetical two-point decrease (from 6 to 4) reduced the probability of receiving medical benefits by 1.8 percentage points in both genders (Table 3, model 1). Of this total effect, 19.0% was mediated by the completion of upper secondary school in girls. In boys, there was no significant mediating effect from the completion of upper secondary school. When adjusting for externalizing problems (model 2), the total effect decreased in both genders, and the proportion mediated by completing upper secondary school was no longer significant for either gender (Table 3, model 2).

The analysis testing the effect of hypothetical change in mental health problems on the probability of receiving medical benefits in the higher levels of the scales (externalizing from 10 to 8 and internalizing from 8 to 6) changed the estimates somewhat. All the total effects increased slightly (Δ , 0.4–0.6 percentage points), except for internalizing problems among boys, where the estimate remained the same. The proportion mediated was about the same (Table 4).

----- Table 4 about here-----

Discussion

During a three-year period in young adulthood, 6.4% of men and 5.9% of women received medical benefits. A hypothetical two-point reduction within the ‘main range’ of externalizing problems decreased the probability of medical benefits by 1.5 percentage points in young men and 1.9 percentage points in young women. The proportion mediated by completion of upper secondary school was 52% among boys and 42% among girls. The corresponding estimated reduction in probability of receiving medical benefits was 1.8 percentage points for a two point hypothetical reduction in internalizing problems in both genders. The proportion mediated was lower for internalizing problems and only statistically significant among girls (19%).

Methodological strengths and limitations

Methodological strengths of the study are the use of population-based survey data regarding both internalizing and externalizing problems in adolescence (the 10th grade) and the availability of national registers with information on completion of upper secondary school, medical benefits and socio-demographic factors. Novel statistical methods were used to estimate possible causal pathways between mental health in adolescents and subsequent receipt of medical benefits in young adulthood by studying the mediating effect of non-completion of upper secondary school modelling a hypothetical change in mental health [21, 22].

A limitation of the study is that not all those who were invited to join the baseline study participated, and not all the participants allowed the survey to be linked with national registers. Thus, our analyses are based on 79% of all 10th graders in the respective counties for the years in question. Unfortunately, we do not have information on individuals who were invited but did not participate in the baseline study. We know that the participants in the baseline study who did not allow linkage of their survey data to national registers did not differ significantly in their reporting of symptoms of mental health problems [7]. However, a selective loss to follow-up cannot be excluded.

The causal mediation analysis makes the untestable sequential ignorability assumption, which in particular implies that there were no unmeasured confounders [22]. Specifically, the relationship between mental health in adolescence and later outcomes may reflect the presence of additional confounding variables, including previous problems or diseases. Since the assumption of no unmeasured confounders is untestable, sensitivity analyses are recommended [22]. Unfortunately, such analyses are not currently available in the mediation package for models where the outcome and the mediator are both dichotomous.

In the primary mediation analysis, we studied both internalizing and externalizing mental health problems separately, and in model 2 we adjusted externalizing problems for internalizing problems (and vice versa). Including both internalizing and externalizing problems in a model could be a problem if one mediates the effect of the other. We have collected information on internalizing and externalising mental health problems at the same time and cannot from our data decide on a direction of a possible causal relationship between the two variables. Adjusting for a variable on the causal chain may bias the results. Hence, in the results from the mediation analysis, we have placed the main emphasis on estimates from model 1, where the two mental health scales were not controlled for each other.

Our findings in relation to previous research and possible explanations

The association between mental health in adolescence and receipt of medical benefits in young adulthood has previously been reported [25-27]. The association found between increased levels of problems and unfavourable outcomes is consistent with our finding using a causal inference statistical framework. One explanation for these associations may be that adolescents with mental health problems have an increased risk of mental illnesses later in life [10, 28, 29], which may be a “direct” cause of work impairment. Additionally, the linkage between adolescent mental health and medical benefits may be mediated by intervening variables. Children and adolescents with mental health problems are at increased risk of adverse adult outcomes, even with no adult disorder [12, 13]. We found that the effect of mental health problems on receipt of medical benefits was partly mediated by non-completion of upper secondary school, with a larger proportion for externalizing problems than for internalizing problems. Similar studies exploring the mediating effect of school drop-out on the association between different dimensions of mental health and subsequent receipt of medical benefits/economic outcomes are difficult to find. Possible explanations for the

stronger mediating role of non-completion of upper secondary school on externalizing problems than on internalizing problems may be that externalizing problems (conduct problems and hyperactivity–inattention) might reflect a cumulative effect of inattention, conduct problems and negative school experiences across the schooling career. Internalizing problems (symptoms of depression, anxiety and peer problems) are likely to disrupt students' overall social functioning and perceived competence, but may be less impairing in a school setting than externalizing problems [7].

We also found that externalizing and internalizing problems were similarly associated with receipt of medical benefits. One could expect that internalizing symptoms would have been of greater importance because anxiety and mood disorders are the most prevalent psychiatric diagnoses resulting in the receipt of medical and vocational rehabilitation benefits in this age group [30]. However, internalizing disorders have been reported to develop as a consequence of school drop-out [8]. Thus, it is possible that individuals who drop out from school (mainly because of externalizing problems) develop internalizing symptoms. Adolescent conduct problems are found to be strongly related to depression and anxiety in adulthood [29, 31], and to commonly co-occur with other disorders [32]. The reduction in the estimate of the hypothetical reduction of both internalizing and externalizing problems, when including both problems in one model (model 2, Table 3), indicates that internalizing and externalizing problems co-occurred in our data.

In our model, we estimated the change in the probability of receiving medical benefits in young adulthood based on a two-point hypothetical decrease in the SDQ scores in adolescence. This (two points) corresponds to about two-thirds of the standard deviation (SD). An intervention reducing the mean score by about two-thirds of the SD would be considered a large effect size (according to Cohen's standard). Effects sizes within this range are commonly reported in studies evaluating the effects of psychotherapy in children and adolescents [33]. When considering general, selective or indicated prevention programmes for mental health problems smaller effect sizes are reported (small-to-moderate at the best) [34, 35]. Nevertheless, assuming our main model to be adequate, our results indicate that interventions reducing mental health problems in adolescence may have the potential to reduce the receipt of medical benefits in young adulthood, and that a mechanism for this estimated effect may be through school completion. However, we have tested a hypothetical reduction in mental health problems, not an effect of a specific intervention program. Still, this study indicates that interventions, which reduce mental health problems in adolescence, may have long-term effects beyond an immediate reduction in symptoms and increased wellbeing, such as reduced school dropout and less welfare dependency in young adulthood. Young people have many years ahead of them in the workforce, implying large potential savings in both societal and personal costs.

Conclusion

Both internalizing and externalizing problems in adolescence had an impact on the probability of receiving medical benefits in young adulthood. For externalizing problems, an important

mechanism for this association seems to be the completion of upper secondary school. Interventions and prevention strategies for mental health problems in adolescence may have the potential to reduce medical benefits in young adulthood. These results encourage the continued search for effective programmes to prevent and reduce the symptoms of mental health problems among children and adolescents.

Authors' contributions

ÅS was active in planning the study and in the conception and design of the paper; she analysed and interpreted the data and drafted the manuscript. TWL participated in the conception and design of the paper, the analyses, and critical review of the paper. SH was involved with the conception and design of the paper, discussing the analyses and data interpretation, and critical review of the paper. LL was involved with the conception and design of the paper, discussing the analyses and data interpretation, and critical review of the paper.

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Conflicting of interest

None declared.

Ethics approval

All parents received written information, and students signed informed consent at baseline indicating their acceptance of the linkage of survey data to register data. Permission to use survey data was given by The Norwegian Institute of Public Health. The study was approved by the Regional Committee for Medical and Health Research Ethics and by the Norwegian Data Inspectorate.

References

- [1] OECD. *Off to a good start?: jobs for youth*. Paris: OECD, 2010.
- [2] OECD. *Jobs for youth, Norway*. Paris: OECD, 2008.
- [3] Lee S, Tsang A, Breslau J, et al. Mental disorders and termination of education in high-income and low- and middle-income countries: Epidemiological study. *Br J Psychiatry*. 2009; 194: 411-7.
- [4] De Ridder KA, Pape K, Johnsen R, Westin S, Holmen TL and Bjorngaard JH. School dropout: a major public health challenge: a 10-year prospective study on medical and non-medical social insurance benefits in young adulthood, the Young-HUNT 1 Study (Norway). *J Epidemiol Community Health*. 2012; 66: 995-1000.
- [5] WHO. *Health for the World's Adolescents: A Second Chance in the Second Decade*. Geneva, Switzerland 2014.
- [6] Erskine HE, Moffitt TE, Copeland WE, et al. A heavy burden on young minds: the global burden of mental and substance use disorders in children and youth. *Psychol Med*. 2015; 45: 1551-63.

- [7] Sagatun A, Heyerdahl S, Wentzel-Larsen T and Lien L. Mental health problems in the 10th grade and non-completion of upper secondary school: the mediating role of grades in a population-based longitudinal study. *BMC Public Health*. 2014; 14: 16.
- [8] Esch P, Bocquet V, Pull C, et al. The downward spiral of mental disorders and educational attainment: a systematic review on early school leaving. *BMC Psychiatry*. 2014; 14: 237.
- [9] Breslau J, Miller E, Joanie Chung WJ and Schweitzer JB. Childhood and adolescent onset psychiatric disorders, substance use, and failure to graduate high school on time. *J Psychiatr Res*. 2011; 45: 295-301.
- [10] Fergusson DM and Horwood LJ. Early conduct problems and later life opportunities. *J Child Psychol Psychiatry*. 1998; 39: 1097-108.
- [11] Patel V, Flisher AJ, Hetrick S and McGorry P. Mental health of young people: a global public-health challenge. *Lancet*. 2007; 369: 1302-13.
- [12] Costello EJ and Maughan B. Annual research review: Optimal outcomes of child and adolescent mental illness. *J Child Psychol Psychiatry*. 2015; 56: 324-41.
- [13] Copeland WE, Wolke D, Shanahan L and Costello EJ. Adult Functional Outcomes of Common Childhood Psychiatric Problems: A Prospective, Longitudinal Study. *JAMA Psychiatry*. 2015; 72: 892-9.
- [14] Norwegian Institute of Public Health. Youth Studies 2000-2009, <http://www.fhi.no/artikler/?id=105586> (2013, accessed 22.03.2015).
- [15] Brage S and Thune O. Medisinske årsaker til uføreytelser blant unge 1977-2006. In: Arbeids- og velferdsdirektoratet, (ed.). *Arbeid og velferd*. Oslo: Arbeid- og velferdsdirektoratet, 2008, p. 28-36.
- [16] Markussen E, Frøseth MW, Sandberg N, Lødding B and Borgen JS. Early leaving, non-completion and completion in upper secondary school in Norway. In: Lamb S, Markussen E, Teese R, Sandberg N and Polesel J, (eds.). *School dropout and completion : international comparative studies in theory and policy*. Dordrecht: Springer, 2011, p. 253-71.
- [17] Goodman A, Lamping DL and Ploubidis GB. When to use broader internalising and externalising subscales instead of the hypothesised five subscales on the Strengths and Difficulties Questionnaire (SDQ): Data from British parents, teachers and children. *J Abnorm Child Psychol*. 2010; 38: 1179-91.
- [18] Lie B. *Immigration and immigrants 2002*. Oslo: Statistics Norway, 2002.
- [19] Statistics Norway. Norwegian Standard Classification of Education (NOS C 751), http://www.ssb.no/english/subjects/04/90/nos_c751_en/nos_c751_en.pdf (2008, accessed 01.01).
- [20] Statistics Norway. Income and Property Statistics for Households 2002 (NOS D 310), http://www.ssb.no/emner/05/01/nos_inntektformue/nos_d310/nos_d310.pdf (2008, accessed 02.01).
- [21] Tingley D, Yamamoto T, Keele L and Imai K. Mediation: R Package for Causal Mediation Analysis. R package version 4.1.2., <http://CRAN.R-project.org/package=mediation> (2012).
- [22] Imai K, Keele L and Tingley D. A general approach to causal mediation analysis. *Psychological Methods*. 2010; 15: 309-34.

- [23] Fayers PM and Machin D. *Quality of life : the assessment, analysis and interpretation of patient-reported outcomes*. Chichester: Wiley, 2007.
- [24] Goodman A and Goodman R. Strengths and difficulties questionnaire as a dimensional measure of child mental health.[Erratum appears in *J Am Acad Child Adolesc Psychiatry*. 2009 Apr;48(4):581]. *J Am Acad Child Adolesc Psychiatry*. 2009; 48: 400-3.
- [25] Pape K, Bjorngaard JH, Holmen TL and Krokstad S. The welfare burden of adolescent anxiety and depression: a prospective study of 7500 young Norwegians and their families: the HUNT study. *BMJ Open*. 2012; 2.
- [26] Gravseth HM, Bjerkedal T, Irgens LM, Aalen OO, Selmer R and Kristensen P. Influence of physical, mental and intellectual development on disability in young Norwegian men. *Eur J Public Health*. 2008; 18: 650-5.
- [27] Sagatun A, Heyerdahl S, Wentzel-Larsen T and Lien L. Medical benefits in young adulthood: a population-based longitudinal study of health behaviour and mental health in adolescence and later receipt of medical benefits. *BMJ Open*. 2015; 5: e007139.
- [28] Fergusson DM and Woodward LJ. Mental health, educational, and social role outcomes of adolescents with depression. *Arch Gen Psychiatry*. 2002; 59: 225-31.
- [29] Colman I, Murray J, Abbott RA, et al. Outcomes of conduct problems in adolescence: 40 year follow-up of national cohort. *BMJ*. 2009; 338: a2981.
- [30] Brage S and Bragstad T. *Unge på arbeids- og helserelevante ordninger*. Oslo: Arbeids- og velferdsdirektoratet, 2011.
- [31] Fergusson DM, Horwood LJ and Ridder EM. Show me the child at seven: the consequences of conduct problems in childhood for psychosocial functioning in adulthood. *J Child Psychol Psychiatry*. 2005; 46: 837-49.
- [32] Lambert E, Wahler RG, Andrade AR and Bickman L. Looking for the disorder in conduct disorder. *J Abnorm Psychol*. 2001; 110: 110-23.
- [33] Weisz JR. *Psychotherapy for children and adolescents: evidence-based treatments and case examples*. Cambridge: Cambridge University Press, 2004.
- [34] Greenberg MT. School-based prevention: current status and future challenges. *Effective Education*. 2010; 2: 27-52.
- [35] Smedler A-C, Hjern A, Wiklund S, Sten A and Petterson A. Programs for Prevention of Externalizing Problems in Children: Limited Evidence for Effect Beyond 6 Months Post Intervention. *Child & Youth Care Forum*. 2015; 44: 251-76.