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Can use of healthcare services among 15–16-year-olds predict an increased level of high school dropout? A longitudinal community study

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ABSTRACT

Objectives: To study associations between healthcare seeking in 15–16-year-olds and high school dropout 5 years later.

Design: Longitudinal community study.

Setting: Data from a comprehensive youth health survey conducted in 2000–2004, linked to data from national registries up to 2010.

Participants: 13 964 10th grade secondary school students in six Norwegian counties.

Main outcome measure: Logistic regression was used to compute ORs for high school dropout.

Results: The total proportion of students not completing high school 5 years after registering was 29% (girls 24%, boys 34%). Frequent attenders to school health services and youth health clinics at age 15–16 years had a higher dropout rate (37/48% and 45/71%), compared with those with no or moderate use. Adolescents referred to mental health services were also more likely to drop out (47/62%). Boys with moderate use of a general practitioner (GP) had a lower dropout rate (30%). A multiple logistic regression analysis, in which we adjusted for selected health indicators and sociodemographic background variables, revealed that seeking help from the youth health clinic and consulting mental health services, were associated with increased level of high school dropout 5 years later. Frequent attenders (≥4 contacts) had the highest odds of dropping out. Yet, boys who saw a GP and girls attending the school health services regularly over the previous year were less likely than their peers to drop out from high school.

Conclusions: Adolescents who seek help at certain healthcare services can be at risk of dropping out of high school later. Health workers should pay particular attention to frequent attenders and offer follow-up when needed. However, boys who attended a GP regularly were more likely to continue to high school graduation, which may indicate a protective effect of having a regular and stable relationship with a GP.

INTRODUCTION

Adolescents reporting poor health tend to have an underconsumption of healthcare facilities according to their expected need, hence a

ARTICLE SUMMARY

Strengths and limitations of this study

- The results of the study are based on a large community study with a substantial number of participants, a high response rate and few missing data.
- The prospective–longitudinal design provides a higher power than a cross-sectional design.
- The study is observational, thus one must be careful to draw conclusions about causal relationships.
- The items addressed in the baseline questionnaire are based on self-report, which can engender an underestimation of health service use and incomplete information on health.

considerable proportion of them seem to have health problems not met by healthcare professionals.[1–3] Studies have suggested that only a minority of adolescents with mental health problems seek healthcare for these reasons.[4 5] Nevertheless, help seekers should be considered a vulnerable group. A US study has shown that disturbed adolescents more frequently seek help from professional healthcare services than do their non-disturbed peers.[6] Furthermore, adolescent frequent attenders to primary healthcare report more physical health complaints, more emotional problems and more days off school than do regular primary healthcare attenders.[7]

Poor mental and physical health are among several factors that can have an influence on help-seeking behaviour and at adolescents' ability to graduate from high school.[8 9] Although chronic disease in childhood has an impact on educational level and work participation in adult life,[10 11] less is known about the effects of ill health during adolescent years.[9] An increasing level of mental health problems in young people, including depressive symptomatology, can play a role[12 13] and several studies have shown associations with failure to

complete high school.[14] [15] In a recent Norwegian study, one of five high school dropouts reported that they quit because of mental health problems.[16] Previous research indicates that teenage pregnancy and substance abuse are also associated with dropping out.[17] [18]

A substantial number of adolescents drop out of high school, placing themselves at higher risk of marginalisation later in life[8] [19] and generating considerable public attention. Norway and several other western countries experience the same challenges. In Norway, adolescents normally enrol in high school at age 15–16, immediately after finishing 10th grade, which is the last year of compulsory school. Students are supposed to complete high school within 3 years. Those who fail to graduate within 5 years after registering as students are defined as high school dropouts. A recent Norwegian study has shown that high school dropouts are at higher risk than their peers of receiving social security benefits 5 years later.[20] Previous studies have found a strong association between low educational level and early receipt of a disability pension.[11] [21] Education is a key to participation in adult work life, and high school graduation has a strong influence on future health and well-being.[8] [22]

The concept of marginalisation is often used to describe a process that in a worst-case scenario can end up in permanent exclusion.[23] Dropping out of high school can be a first step in the process of marginalisation. High school dropout and marginalisation among young adults are fields that must be approached from different angles. Both individual characteristics and contextual factors related to family, friends, the community, the schools and the school system have an influence on dropout.

In our study we addressed the problem from a health-related perspective, by exploring whether adolescents at risk had made contacts with the health services already at age 15–16 years. Help-seeking behaviour cannot be explored without including health and sociodemographic background factors. As we consider help seekers a vulnerable group, the aim of our study was to determine whether adolescent help seekers also have increased odds of high school dropout in a longitudinal perspective.

METHODS
Population
A comprehensive health survey of all 10th grade secondary school students (aged 15–16 years) in six Norwegian counties, was conducted between 2000 and 2004. The youth survey was initiated in Oslo in 2000 and was extended to include five more counties in the following years, 2001–2004. Originally 18 425 10th graders were invited to the baseline studies, while the overall response rate was 87% (n=15 966). The study was organised as a classroom survey, where the pupils filled a written questionnaire during two school hours. An assistant was present to provide information to the participants and administer the questionnaires. Pupils not present at school at the day of the survey were left questionnaires

at the schools to be filled out later. Those not responding, received a copy by mail to their home address along with a stamped return envelope.

Participation in the survey was voluntary and the pupils signed an informed consent in advance. The survey comprised questions about relationships with family, friends and school; physical and mental health; health behaviour and life events.[24] More detailed information about the health survey is available on the website of the Norwegian Institute of Public Health.[25]

Questionnaire data from the study were linked to data from the National Education Registry and the National Insurance Services (NIS/FD-trygd), compulsory national databases which supply detailed information on the entire cohort up to the year 2010. A precise linkage of records was possible because of the national identification number given to every resident of Norway. After linkage by Statistics Norway, the national identification numbers were removed from the data sets and kept within a safe computer system to secure anonymity for each individual. At baseline, the adolescent contributors to the questionnaires were asked for their consent to link the data from the questionnaires to national registers at a later date; 90% of the 15 966 in our baseline population agreed (n=14 062).

From the NIS we obtained information on participants who were granted an early-permanent disability benefit (n=55) during the follow-up period. We excluded those individuals from the study, as a majority were diagnosed with mild-to-moderate mental retardation, diagnoses within the autistic spectrum or severe psychiatric disorders like schizophrenia—conditions which were not compatible with high school graduation.

Participants who died (n=43) during follow-up time were also excluded from the analyses, leaving us with a total study group of n=13 964.

Ethics
The study was approved by the regional committee for Medical and Health Research Ethics and by the Norwegian Data Inspectorate. These institutions gave permission for the use and linkage of the data. The adolescent participants gave a written consent to link their questionnaire data to national registers at a later date.

Variables
High school dropouts
From the National Education Registry, we obtained information on adolescents who had failed to complete high school, which is the main outcome variable in this article. In Norway, adolescents normally enrol in high school at age 15–16 years, immediately after finishing 10th grade, which is the last year of compulsory schooling in Norway. Students are expected to complete high school within 3 years. Those who did not graduate within 5 years after registering as high school students are defined for the purposes of this study as high school dropouts.[26]

Use of healthcare services

In the baseline questionnaires, participants answered questions about help seeking from the healthcare system during the 12 months prior to the survey, whether through school health services, youth health clinic, general practitioner (GP) or child and adolescent mental health services. The GP, the school health services and the youth health clinic in Norway are considered low-threshold parts of the primary healthcare system, and are all free of charge for children and adolescents up to the age of 16 years. The services of child and adolescent mental health are paid for by the government, but a referral is required from a GP or another physician. To measure the use of healthcare services, the contributors were given three response options—'none', '1–3' or '4 or more'—for number of contacts during the past year. In our analyses, we aggregated contacts with the child and adolescent mental health services into two categories: 'none' or '1 or more' contacts. The *reason* for visiting any of the service providers was not measured in the questionnaires.

Health indicators

At baseline, adolescents were asked questions concerning their health, including direct questions on specific conditions. As adjustment variables we used the baseline questions addressing the adolescents' self-perceptions of the status of their general health, if they had or have had asthma or allergies, and conditions experienced in the 12 months prior to the survey: serious illness or injury, headache, abdominal pain, neck pain or shoulder pain, back pain or pain in extremities. The contributors could answer 'yes' or 'no' to these health-related and pain-related questions. Self-rated health is a health measure that can predict later morbidity, mortality, health service use and early disability.[27] During adolescence, self-rated health status appears to be relatively stable, and it seems not to be changed by medical diagnoses or by mental or somatic health symptoms.[27] Self-rated health is considered to have good reliability for adults.[28] In the baseline questionnaire, self-rated health was categorised into four options: 'bad', 'not good', 'good' or 'very good'. In our analyses, we dichotomised this variable into two categories: 'very good or good' and 'not good or bad'. We also aggregated the pain variables into a dichotomous variable, in which three or more pain sites indicated a positive pain score and two or fewer indicated a negative pain score. We consider widespread pain to be an independent indicator of ill health. We also know from previous research that there is a certain comorbidity in adults between depressive disorders and chronic pain.[29] Level of mental health problems were scored using the Hopkin's Symptom Checklist-10 (HSCL-10), a short-form of the Hopkin's Symptom Checklist-25 (SCL-25), and an instrument designed to diagnose depression in primary healthcare.[30] The HSCL-10 includes 10 questions about psychological symptoms experienced over the previous week and is validated for use both in general practice and in epidemiological studies.[31] A sum score above 1.6 indicates mild, moderate or severe depression among 14–16-year-olds.

Sociodemographics

The sociodemographic background variables concerning parents' marital situation and household income were based on self-reports from the baseline questionnaires. The pupils were asked whether their parents' were 'married/living together', 'divorced/separated', 'one or both dead' or 'other'. We chose to dichotomise these options into 'married/living together' or 'other'. The question concerning household income were categorised into 'very good', 'good', 'mediocre' or 'poor'. Here we chose to collapse 'very good' and 'good' into one category, which we used as the reference category. Information on parents' educational level was provided by Statistics Norway. The highest accomplished educational level of one of the parents was used, leaving us with four categories: 'higher college or university degree' (>4 years); 'lower college or university degree'; 'high school' or 'primary school'.

Statistical analyses

Analyses of the data set were performed using multiple logistic regression analysis in SPSS V.19.0, with high school dropout as the outcome variable. In the crude model, we tested the variables concerning health service usage separately and ORs were computed for high school dropout. In the adjusted model, use of healthcare services was adjusted for each other, for the selected health indicators and for sociodemographic background variables. All analyses were stratified by gender.

RESULTS

Girls comprised 50.3% of our study group. Descriptive data of the population are presented in table 1. Missing data as a result of skipped questions concerning health-care seeking varied from 0.8% to 1.6%, whereas the questions on health had missing values from 1.1% to 6.5%. Follow-up data indicated that 28.9% of the students did not complete high school within 5 years (girls 23.8%, boys 34.2%). The descriptive baseline material revealed that 70% of the adolescents attended one or more healthcare services over the previous year: school health services (girls 32.4%, boys 16.4%), youth health clinic (girls 21.1, boys 7.8%), GP (girls 59.5, boys 46.5%), child and adolescent mental health services (girls 6.9, boys 3.7%). Girls had substantially more contacts than did boys. A smaller number of the adolescents reported four or more contacts with school health services (girls 4.7, boys 0.9%) and the youth health clinic (girls 3.7, boys 0.6%), whereas 12.1% of the girls and 6.6% of the boys reported multiple contacts with a GP.

With few exceptions, adolescents who reported use of different healthcare services during the past 12 months, generally reported more health problems, compared

Table 1 Descriptive characteristics of the study population (N=13 964) at baseline, 2000–2004, and at follow-up, 2010

At baseline	N	Per cent
Gender		
Girls	7019	50.3
Boys	6945	49.7
Sociodemographic characteristics		
Ethnicity		
Ethnic Norwegian	12155	87.0
First-generation immigrant	1126	8.1
Second-generation immigrant	683	4.9
Parents' educational level		
College or university degree >4 years	1937	13.9
College or university degree ≤4 years	4277	30.6
High school	5681	40.7
Primary school	1864	13.3
Missing	205	1.5
Parents' marital status		
Married or living together	9255	66.3
Other	4600	32.9
Missing	109	0.8
Household income		
Very good or good	8732	62.5
Mediocre	4546	32.6
Poor	457	3.3
Missing	229	1.6
Status at follow-up		
High school dropout		
Total	4040	28.9
Girls	1668	23.8
Boys	2372	34.2

with those who reported no use of such health services (table 2). Among frequent attenders (≥4 visits), a substantially higher percentage reported health problems compared with those with moderate use of services. This was the case for both girls and boys.

As shown in table 3, a higher rate of high school dropouts were observed among frequent attenders to the school health services (girls 36.5%, boys 48.3%) and the youth health clinic (girls 44.5, boys 71.1%), compared with those with no or moderate use (1–3 visits). Also adolescents referred to the mental health service had a higher dropout rate (girls 47%, boys 62.2%). Boys with moderate use of a GP, had a lower dropout rate (29.8%).

Table 4 shows that visiting the child and adolescent mental health services at age 15–16 years was strongly associated with dropping out of high school 5 years later, in both genders (girls' OR 3.18, 95% CI 2.63 to 3.84; boys 3.37, 2.60 to 4.37). Likewise, seeking help at the youth health clinic (1–3 contacts: girls 1.83, 1.60 to 2.10; boys 1.64, 1.36 to 1.97; ≥4 contacts: girls 3.06, 2.37 to 3.95; boys 5.02, 2.48 to 10.14). The associations remained significant after adjustment for use of other healthcare services, health indicators and sociodemographic variables—except for boys with moderate use of

the youth health clinic. In the unadjusted analyses, attending the school health services was associated with dropping out of high school (1–3: girls 1.15, 1.01 to 1.30; boys 1.36, 1.19 to 1.56; ≥4: girls 2.02, 1.59 to 2.56; boys 1.93, 1.16 to 3.21), while after adjustments in girls, moderate use of school health services had a slightly protective effect (0.82, 0.70 to 0.96).

Between 1 and 3 contacts with the GP the previous year was associated with a lower level of high school dropout in boys (0.73, 0.65 to 0.81). Boys who were regular users of a GP also had a significant lower dropout rate in the adjusted model.

DISCUSSION
Main findings
Results revealed that 15–16-year-olds who attended the youth health clinic and those who saw the child and adolescent mental health services were significantly more likely to drop out of high school 5 years later than were those who did not seek help at these services. We also found that use of school health services was related to high school dropout, in both genders, but not after adjustments had been made. On the contrary, girls who reported 1–3 contacts with the school-based clinic the past year, had a slightly better outcome. Also boys who attended a GP regularly were more likely to continue to high school graduation, which may indicate a protective effect of having a regular and stable relationship with a GP.

Strengths and weaknesses
The substantial number of participants in geographically diverse areas, along with a high response rate and few missing data constitute the strengths of this prospective community study. The adolescent study sample should be representative, therefore, for a general youth population. Furthermore, the compulsory Norwegian registries provided us with complete, reliable follow-up material. The prospective longitudinal design provided the opportunity to observe a temporal order of events on an individual level, and it can be argued that the power is stronger compared with that of a cross-sectional design. One should be careful, however, not to draw conclusions about causal relationships, given the observational nature of the study.

The baseline survey was conducted in six Norwegian counties in both urban and rural areas and encompasses the entire youth population in these regions. Yet, because local variations in the accessibility of healthcare services can influence help-seeking behaviour, our results may not be applicable in all settings.

One limitation of the questions concerning health—variables which were adjusted for in the analyses—is the lack of information they provide on the severity or chronicity of conditions. Furthermore, the help-seeking variables in the baseline survey provide no reasons for the adolescents' encounters with the health system.

Table 2 Percentage of 15–16-year-olds reporting different health problems within type and level of reported healthcare use, all numbers stratified by gender (N=13964)

	Asthma		Allergy		Poor self-perceived health		Experienced serious illness/injury past 12 months		Pain sites ≥3 past 12 months		HSCL-10≥1.6	
	Girls N (%)	Boys N (%)	Girls N (%)	Boys N (%)	Girls N (%)	Boys N (%)	Girls N (%)	Boys N (%)	Girls N (%)	Boys N (%)	Girls N (%)	Boys N (%)
Total numbers reporting health problems	910 (13.7)	897 (13.5)	2756 (41.0)	2448 (36.5)	960 (13.9)	645 (9.4)	606 (9.2)	651 (9.9)	2683 (40.4)	1473 (22.3)	2390 (35.2)	906 (13.4)
Within self-reported level of healthcare use												
School health services												
None	565 (12.7)	726 (13.2)	1758 (39.1)	2008 (36.1)	556 (12.1)	492 (8.7)	351 (8.0)	498 (9.1)	1555 (35.0)	1135 (20.7)	1415 (31.1)	688 (12.2)
1–3	270 (15.0)	150 (14.8)	821 (44.8)	398 (38.8)	296 (15.7)	132 (12.5)	189 (10.6)	133 (13.3)	894 (48.8)	298 (29.7)	750 (40.3)	194 (18.9)
≥4	63 (20.7)	8 (13.3)	150 (48.1)	20 (35.1)	86 (26.8)	10 (16.7)	54 (17.9)	11 (19.3)	201 (65.3)	24 (41.4)	200 (63.3)	22 (36.7)
Youth health clinic												
None	671 (12.8)	796 (13.1)	2093 (39.6)	2214 (36.2)	679 (12.6)	553 (8.8)	433 (8.3)	567 (9.4)	1922 (36.8)	1289 (21.3)	1709 (32.1)	786 (12.7)
1–3	183 (16.3)	79 (16.9)	533 (46.5)	191 (40.6)	201 (16.9)	70 (14.4)	138 (12.5)	68 (14.8)	591 (51.8)	150 (32.3)	524 (44.7)	103 (21.5)
≥4	49 (20.3)	5 (13.5)	114 (46.5)	11 (30.6)	67 (26.4)	7 (18.4)	34 (14.3)	7 (19.4)	150 (61.7)	13 (36.1)	146 (57.9)	12 (33.3)
General practitioner												
None	237 (8.8)	365 (10.4)	870 (32.2)	1128 (31.9)	258 (9.3)	301 (8.3)	108 (4.1)	192 (5.5)	805 (30.2)	605 (17.3)	796 (29.2)	437 (12.2)
1–3	485 (15.6)	410 (15.6)	1413 (44.8)	1074 (40.7)	466 (14.4)	255 (9.4)	284 (9.2)	314 (12.0)	1377 (44.0)	680 (26.1)	1155 (36.3)	373 (13.9)
≥4	178 (22.8)	105 (24.4)	450 (56.2)	208 (47.5)	223 (27.1)	73 (16.2)	211 (27.4)	137 (32.2)	480 (60.2)	163 (38.6)	422 (51.7)	90 (20.4)
Child and adolescent mental health services												
None	810 (13.2)	834 (13.2)	2499 (40.3)	2323 (36.3)	793 (12.5)	584 (8.9)	525 (8.6)	601 (9.6)	2383 (38.8)	1361 (21.6)	2046 (32.6)	803 (12.4)
≥1	87 (19.5)	47 (19.5)	238 (51.7)	96 (39.8)	147 (31.5)	46 (18.5)	76 (17.7)	43 (18.5)	272 (60.0)	90 (37.5)	323 (69.5)	96 (40.5)

HSCL-10, Hopkin's Symptom Checklist-10.

Table 3 Healthcare seeking behaviour and health indicators in 15–16-year-olds and percentage of high school dropout 5 years later (N=13 964)

	Girls		Boys	
	N (%)	Dropout (%)	N (%)	Dropout (%)
Self-reported level of healthcare use				
School health services				
None	4690 (67.7)	22.2	5728 (83.6)	32.7
1–3	1917 (27.7)	24.6	1064 (15.5)	39.8
≥4	323 (4.7)	36.5	60 (0.9)	48.3
Youth health clinic				
None	5496 (79.0)	20.8	6314 (92.3)	32.8
1–3	1209 (17.4)	32.4	490 (7.2)	44.5
≥4	256 (3.7)	44.5	38 (0.6)	71.1
General practitioner				
None	2808 (40.5)	23.4	3653 (53.4)	36.8
1–3	3289 (47.4)	22.5	2729 (39.9)	29.8
≥4	841 (12.1)	27.8	453 (6.6)	36.0
Child and adolescent mental health services				
None	6463 (93.1)	21.8	6590 (96.3)	32.8
≥1	477 (6.9)	47.0	251 (3.7)	62.2
Health indicators				
Asthma				
None	5730 (86.3)	23.1	5753 (86.5)	33.3
Yes	910 (13.7)	27.1	897 (13.5)	37.9
Allergy				
None	3958 (59.0)	21.9	4261 (63.5)	33.5
Yes	2756 (41.0)	25.9	2448 (36.5)	34.4
Self-perceived health				
Very good/good	5932 (86.1)	21.8	6227 (90.6)	32.8
Not good/poor	960 (13.9)	36.8	645 (9.4)	46.8
Serious illness/injury past 12 months				
None	5956 (90.8)	23.1	5929 (90.1)	33.4
Yes	606 (9.2)	24.1	651 (9.9)	37.2
Pain sites reported past 12 months				
<3	3917 (59.6)	19.6	5107 (77.7)	31.6
≥3	2463 (40.4)	29.3	1385 (22.3)	42.2
HSCL-10				
<1.6	4391 (64.8)	19.3	5848 (86.6)	31.8
≥1.6	2390 (35.2)	30.5	906 (13.4)	45.7
Sociodemographic variables				
Ethnicity				
Ethnic Norwegian	6115 (87.1)	22.5	6040 (87.0)	31.8
First generation immigrant	580 (8.3)	36.7	546 (7.9)	53.7
Second generation immigrant	324 (4.6)	25.0	359 (5.2)	43.7
Parents' marital status				
Married/living together	4655 (66.6)	18.4	4600 (67.0)	28.8
Other	2335 (33.4)	34.2	2265 (33.0)	44.1
Household income				
Very good or good	4212 (60.9)	20.2	4520 (66.2)	31.9
Mediocre	2450 (35.4)	27.3	2096 (30.7)	36.2
Poor	250 (3.6)	45.6	207 (3.0)	48.3
Parents' educational level				
College/university degree >4 years	1001 (14.5)	7.6	936 (13.7)	12.8
College/university degree ≤4 years	2135 (30.9)	14.3	2142 (31.3)	24.2
High school	2867 (41.4)	29.1	2814 (41.1)	39.5
Primary school	915 (13.2)	44.3	949 (13.9)	59.1

HSCL-10, Hopkin's Symptom Checklist-10.

Self-reports can imply an underestimation of health service usage, especially use of mental health services. Other health problems than those adjusted for in our analyses could have influenced help-seeking behaviour and failure to complete high school. Yet, disability benefits acquired at a young age were considered to have

Table 4 Associations between healthcare-seeking behaviour evaluated in 10th-grade adolescents and high school dropout 5 years later

Self-reported level of healthcare use	Crude		Adjusted†	
	Girls	Boys	Girls	Boys
	OR (95% CI)‡	OR (95% CI)	OR (95% CI)	OR (95% CI)
School health services				
None (ref)				
1–3	1.15 (1.01 to 1.30)*	1.36 (1.19 to 1.56)***	0.82 (0.70 to 0.96)*	1.15 (0.97 to 1.36)
≥4	2.02 (1.59 to 2.56)***	1.93 (1.16 to 3.21)*	0.86 (0.63 to 1.17)	0.71 (0.37 to 1.36)
Youth health clinic				
None (ref)				
1–3	1.83 (1.60 to 2.10)***	1.64 (1.36 to 1.97)***	1.72 (1.45 to 2.04)***	1.16 (0.92 to 1.45)
≥4	3.06 (2.37 to 3.95)***	5.02 (2.48 to 10.14)***	1.99 (1.45 to 2.73)***	2.76 (1.24 to 6.13)*
General practitioner				
None (ref)				
1–3	0.95 (0.84 to 1.07)	0.73 (0.65 to 0.81)***	0.89 (0.77 to 1.03)	0.69 (0.61 to 0.79)***
≥4	1.26 (1.06 to 1.50)**	0.96 (0.79 to 1.18)	0.87 (0.69 to 1.10)	0.85 (0.66 to 1.09)
Child and adolescent mental health services				
None (ref)				
≥1	3.18 (2.63 to 3.84)***	3.37 (2.60 to 4.37)***	2.04 (1.60 to 2.60)***	2.85 (2.07 to 3.93)**

Investigated using multiple logistic regression analysis.
*Significant relationship, p≤0.05.
**Significant relationship, p≤0.01.
***Significant relationship, p≤0.001.
†In the adjusted model use of each health service is adjusted for use of the other healthcare services, health indicators and sociodemographic variables.
‡All associations were expressed in OR with 95% CI.

been the result of the most serious health disabilities, and were therefore excluded from our sample.

A recent validation study confirms that the HSCL-10 instrument, which we have used to measure mental health problems, is a suitable diagnostic tool for adolescents in this age group, and is also found to be appropriate for use in epidemiological studies.[31] Although our cut-off point of 1.6 has been validated as optimal for detecting mild, moderate and severe depression in 14–16-year olds of both genders,[31] it can be argued that this cut-off may be low, and could thereby define an unreasonably large proportion of adolescents as depressed.[32,33] Another constraint is lack of a measure of other types of mental health problems.

High school dropout has been chosen as the outcome variable because it is an early marker for later work marginalisation and social exclusion.[11,20,21] Previous studies indicate that those who drop out of high school have a higher risk of becoming dependent on welfare benefits in adult life, including receipt of an early-disability pension.[11,34,35] It can be argued that the 5-year limit is strict, but it is consistent with other studies on school dropout, and few of those who fail to complete high school within 5 years succeed in finishing later.[19,26]

Comparison with previous research

We do not imply that health service use in adolescence causes high school dropout, rather that it is a proxy for problems which can be independent risk factors for dropout. Although several studies confirm an underuse

of healthcare among adolescents who struggle with somatic and mental health issues,[1,36] both previous research[7] and the descriptive material in our study, as shown in table 2, confirm that help seekers constitute a group which generally have a greater load of health problems compared with non-seekers, and should receive special attention. Both structural and individual factors influence help seeking.[36,37] From previous research we know that such sociodemographic characteristics as economic status and parents' educational level influence both help seeking[2,7] and high school graduation.[8,19] Health complaints which commonly lead adolescents to seek help can also influence them to drop out. After correcting for such factors in our analyses, we found a negative outcome in adolescents seeking help at the youth health clinic and the mental health services, indicating that they have other challenges that can explain their higher probability of dropping out. However, help seekers may have resources and certain personal qualities that enable them to recognise and cope with their problems—a characteristic which we cannot correct in the analyses.[3]

Youth health clinics in Norway provide free advice and prescriptions for birth control and treatment of sexually transmitted diseases. In addition, it is a low-threshold service centre where adolescents can consult a nurse or a physician about mental health issues. Visiting the youth health clinic multiple times at 15–16 years of age can indicate sexual debut at an early age. We know that adolescent pregnancy is a risk factor for lower

educational achievement,[18] but less is known about early sexual activity in general and failure to complete high school. A previous study has shown associations between low-academic achievement and high level of externalising behaviour and early sexual debut in both genders.[38] A US study on adolescents receiving mental health treatment shows associations between both externalising and internalising psychiatric disorders and sexual risk-taking behaviour.[39] To the best of our knowledge, there is limited research on boys who attend the youth health clinic or similar services, and there are few boys in our sample with multiple encounters. Those who have multiple encounters, however, have a dropout rate above 70%. Our results indicate that health workers in youth health clinics should be aware of and offer follow-up to adolescents with multiple visits.

In the crude model, adolescent attenders to the school health services generally had a higher level of high school dropout. After adjustments, though, girls with moderate attendance turned out to have slightly lower odds for dropout. A recent US study has found an association between low-to-moderate use of school-based health centres and reduction of dropout for high school students;[40] a finding which is in line with our result. The American school-based health centres, however, offer a wider range of health services than do school health services in Norway, and are therefore not directly comparable.

We found that consulting the child and adolescent mental health services was associated with lower odds for graduating from high school. As a referral is needed to see the mental health services, we argue that individuals who qualify for specialised therapy usually have relatively severe mental health problems. A previous study has shown that there is a dose–response association between help seeking for mental health problems and symptom load of anxiety and depression.[41] Furthermore, the early-onset mental disorders have been shown to be associated with lower educational attainment.[12 13] It is not surprising, then, that the outcome in the group consulting mental health services at age 15–16 years is less fortunate.

Boys who saw a GP regularly were more likely to graduate from high school than their peers, although there was no such statistically significant relationship for girls. This finding suggests that, for boys, having a stable relationship with a GP in their adolescent years can have a positive impact. Yet, although we assume that the boys who utilise GP services are consulting for health problems and that they are helped in some way, they may also have individual resources which explain their better outcomes. Teenage boys have a substantially lower use of healthcare services than do girls, including seeing a GP.[42] They are also more reluctant to seek help for emotional problems unless severely distressed.[37 43]

Implications for policy and practice

Previous research confirms that adolescents have frequent encounters with the primary healthcare services every year,[4 44 45] which is consistent with our findings.

These contacts provide golden opportunities to uncover somatic health problems and mental distress. Health workers in the primary healthcare services should pay particular attention to adolescents with multiple health service encounters and offer follow-up when needed. It is also important to refer to the specialist services when the severity of the condition calls for it. Our results may suggest that by the time adolescents are referred to second-line mental health services, their conditions are well entrenched and the prognosis is consequently more negative.

Youth health clinics are low-threshold services which are visited by a substantial number of adolescents every year—especially young girls. Considering the high probability of dropping out among attenders of this service, as shown in our study, health workers should be advised to focus particularly on these adolescents and the quality of their treatment.

Although girls report more health problems and a higher level of health service usage than boys, they are more likely to graduate from high school—a divergence that calls for a broader approach to the relationship between health and failure to complete high school. More research is needed to disentangle the role of health services in dealing with adolescent health and possible preventive potential for adolescents' symptom load and functional impairment in the following years.

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