



BMJ Open Associations between e-health questionnaire responses, health checks and graduation: Finnish register-based study of 2011–2012 university entrants

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ABSTRACT

Objective To evaluate the association between health and study-related factors measured by an Electronic Health Questionnaire (eHQ), participation in a health examination process and graduation in a university student population.

Design Nationwide, retrospective, register-based cohort study with a 6-year follow-up.

Setting Student health care in Finland. Finnish Student Health Service (FSHS) provides statutory student health services to university students in Finland. The health examination process of FSHS includes the eHQ provided annually to university entrants and a subsequent health check when necessary based on students' eHQ response.

Participants A national cohort of university entrants from the 2011–2012 academic year (n=14 329, n (female)=8075, n (male)=6254).

Outcome measures The primary outcome measure was graduation, measured based on whether a student had completed a bachelor's, licentiate or master's degree during the 6-year follow-up.

Results Some 72% of the women and 60% of the men had graduated during the follow-up. The predictors in the eHQ associated with non-graduation differed by sex. Among the women's low enthusiasm about studies (OR 2.6, 95% CI 1.9 to 3.6), low engagement with studies (OR 2.5, 95% CI 1.8 to 3.4) and daily smoking (OR 1.9, 95% CI 1.4 to 2.6) were the strongest predictors to non-graduation. Among the men, low engagement with studies (OR 3.7, 95% CI 2.5 to 5.5) and obesity (body mass index \geq 35) (OR 4.0, 95% CI 1.9 to 8.8) were the strongest predictors to non-graduation. Not attending the health check when referred was associated with non-graduation in both sexes: the OR for not graduating was 1.6 (95% CI 1.3 to 1.9) in women and 1.3 (95% CI 1.0 to 1.6) in men.

Conclusions Engagement and enthusiasm about studying in the first year are important predictors of graduation and therefore a potential intervention target. Health promotion initiatives conducted early in the studies may have a positive effect on students' academic achievement.

INTRODUCTION

A reasonable amount of evidence on the association between health-related factors and academic achievement is available; however, the evidence is contradictory. A

Strengths and limitations of this study

- This was the first study to investigate the association between health checks and graduation.
- The major strength of the study was the study population, which consisted of the whole cohort of university entrants in Finland from the 2011–2012 academic year.
- The main limitations of the study were the relatively low response rate to the Electronic Health Questionnaire (55%), a heavy reliance on the nurses' professional competence in interpreting the questionnaire and the use of self-reported data.
- The eHQ was developed for practical purposes, and therefore all questions were not validated.

reciprocal relationship between health, health behaviour and academic achievement has been suggested.¹ Poor health can affect academic performance, whereas poor academic performance can cause health issues. A deeper understanding how the well-being of students is associated with academic achievement is needed to develop student healthcare services in order to detect risk factors for study ability as early as possible. Study ability is student's work ability, the concept of which is presented elsewhere.²

In Finland, unlike in some other countries, the health and health habits of the university students are better compared with their peers either studying at universities of applied sciences or working.^{3–5} In numerous countries, Finland included, there is widespread concern about the mental health of university students.^{3 6–8} Some 34% of Finnish higher education students have reported moderate or poor psychological well-being.³ Mental health issues are considered to be one of the biggest health-related threats for academic achievement.^{9–15}

The prevalence of sleeping problems is high in the university student population.^{3 16} Sleep quality and sleep habits have been indicated to be associated with academic performance,^{9 17 18} though in some studies no association has been detected.^{1 19} In addition, evidence of the association between academic achievement and physical activity in the university student population is contradictory.^{9 17 20} A meta-analysis including also several studies with college students revealed a negative correlation between body mass index (BMI) and academic achievement.²¹

Finnish Student Health Service (FSHS) provides student healthcare services, including medical care, to all bachelor's and master's degree students and medical licentiate students (approximately 125 000) in universities in Finland. The basis of preventive work in FSHS is a statutory health examination process that was designed to identify and support students at risk of decreased study ability.^{2 22 23} The process includes an Electronic Health Questionnaire (eHQ) provided to all university entrants and a subsequent health check when necessary based on the students' eHQ responses. The eHQ consists of several questions about health, social relations and studying, and it has been shown to facilitate the identification of students' health problems.²⁴ The health check is a general health check conducted by a public health nurse. Participation in the health examination process is voluntary for students.

To our knowledge, no studies have been conducted about the association between health checks and academic achievement. Health and study-related factors associated with academic achievement have mostly been studied separately and more in school-aged children than in university students.^{1 25–29}

We aimed to use the data from FSHS health examination process to explore the associations between student's health, social relations and approach to studies at entry, and their graduation.

Specifically, the objectives of the study were

1. How are university entrants' responses to the eHQ questions associated with graduation during a 6-year follow-up?
2. How is participating in the FSHS health examination process associated with graduation during a 6-year follow-up?

METHODS

This was a nationwide register-based cohort study with a 6-year follow-up, the design and methodology of which have been described previously.² We used the Strengthening the Reporting of Observational Studies in Epidemiology cohort checklist when writing our report.³⁰ The study was a real-life study on an ongoing FSHS health examination process. It used the data that the process produced about the health of university entrants, and these were analysed in relation to the students' graduation. The population was the whole cohort of university entrants from the 2011 to 2012 academic year in Finland

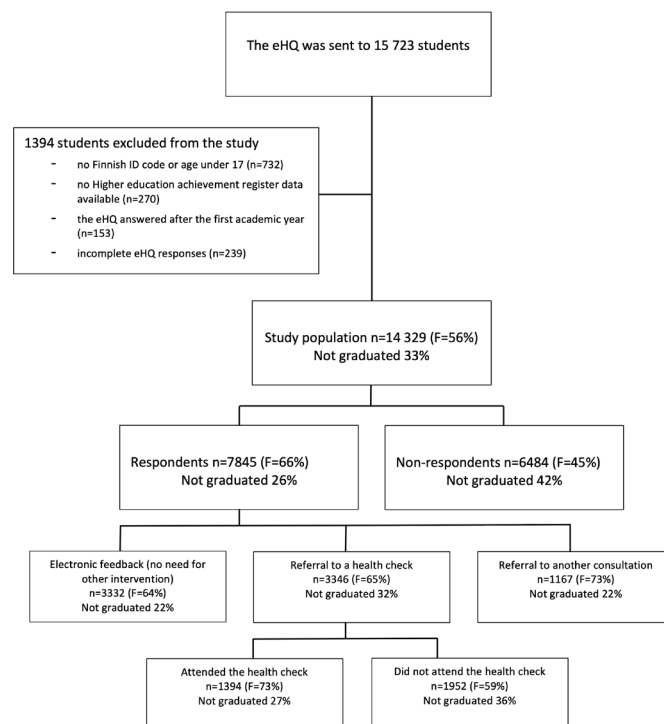


Figure 1 Participation in the health examination process, the exclusion criteria of the study and the proportions of the non-graduated students (n=4786) in each step of the health examination process. eHQ, Electronic Health Questionnaire; FSHS, Finnish Student Health Service; ID, identification.

(n=15 723). The final study population in the analyses consisted of 14 329 students after exclusions (figure 1). In Finland, university admission means that the admitted students can continue their studies directly to the master's degree (graduate) after gaining the bachelor's degree (undergraduate). Accordingly, the word entrants in this study indicate students admitted to the undergraduate studies.

Electronic health questionnaire

The eHQ comprised 26 questions about health, social relations and studying (online supplemental file 1). The responses were considered and handled by FSHS public health nurses. Based on the eHQ response, the nurse suggested to the student one of the following interventions: (1) referral to a health check conducted by a public health nurse; (2) referral to an appointment other than a health check, for example, physiotherapy; or (3) in case there was no need for other interventions, an electronic message to the student to support a healthy lifestyle.

Ten of the eHQ questions had a response scale from –10 to +10. Respondents were guided to interpret the scale so that positive numbers suggested a favourable situation, and zero (0) suggested a neutral situation. Negative numbers suggested a problematic situation. The distributions of the responses were highly skewed to the high positive end of the scale. We wanted to examine whether also low positive values indicated a problematic situation. The responses were therefore categorised into three

categories for statistical analysis as high (8–10), medium (0–7) and low (–10 to –1).

Drug use of was assessed by asking ‘Have you experimented with or used any drugs or taken alcohol and medication at the same time in order to get intoxicated?’. The response alternatives were ‘never’; ‘yes, 1–4 times’; and ‘yes, 5 times or more often’. For the statistical analysis, the latter two responses were combined into one ‘yes’ category.

Alcohol use was assessed by asking ‘Do you use alcohol?’. Subsequent to the response ‘yes’, the 10-item Alcohol Use Disorders Identification Test (AUDIT) was presented.³¹ AUDIT points were calculated and categorised into four categories according to the WHO classification: <8 low risk, 8–15 medium risk, 16–20 high risk and >20 possible alcohol dependence.³²

Age was categorised as in the Eurostudent study and in the Finnish University Students’ Health Survey as follows: 17–21 years, 22–24 years, 25–29 years and 30 years or older.^{3,33} Students reported their height and weight in the eHQ. BMI was calculated and categorised following the WHO categorisation: <18.5 (underweight), 18.5–24.99 (normal weight), 25.0–29.99 (overweight), 30.0–34.99 (obese, Class I), ≥35 (obese, classes II and III).³⁴

The eHQ data included register-based information about the faculty of the students. For statistical analyses, the faculties were categorised to form the variable ‘field of study’. The categorisation was based on the classification in the Finnish University Students’ Health Survey and is in accordance with the field of studies listed by the Ministry of Education and Culture.³ Some faculties could not be categorised due to representing two categories and were therefore categorised as ‘other’.

Academic achievement

Academic achievement was measured on the basis of whether a student had completed a bachelor’s, licentiate or master’s degree within six academic years. Completing a degree was defined as ‘graduated’ and was used as a dependent variable in this study. Medical, dental and veterinary medicine students achieve a licentiate or master’s degree not preceded by a bachelor’s degree, while not all bachelors continue to a master’s degree.

In Finland, the median time to complete a degree was 3.8 years for a bachelor’s degree and 5.9 years for a master’s degree (including a bachelor’s degree) in 2017 when the follow-up time of this study ended.³⁵

Data sources

The eHQ data were obtained from the eHQ register of FSHS for the 2011–2012 academic year. The information about students’ attendance at the health check was collected from FSHS medical records. The data about the number of terms the students were registered as present at the university, and the graduation data were obtained from the Higher education achievement register of the National data warehouse for higher education from the

beginning of the 2011–2012 academic year to the end of the 2016–2017 academic year.

The data were linked by using Finnish personal identity codes.³⁶ In 1964, Finland introduced a personal identification code system, and since then, practically all administrative registers have included this unique identification code, which enables data linkage between the registers and individual-level analyses.³⁷ The information about the sex of the students was based on the personal identity codes.

Statistical analysis

To describe the data, the frequencies and percentages of each variable were calculated. χ^2 tests were employed to detect associations between the categorical variables. In cases with continuous non-normally distributed data, the Mann-Whitney U test was used to detect the differences between groups. A p value of <0.01 was considered to be statistically significant.

The data were analysed with a binary logistic regression model to detect the variables in the eHQ and interventions based on the eHQ that were statistically significantly associated with non-graduation. In the logistic regression models, the ORs of the categorical variables were compared against the reference category of each variable, with the exception that the field of study was compared against the mean of all study fields. First, univariate models were created for each predictor separately. Further, as many of the students may have had several risk factors, the model was adjusted by using multivariable logistic regression with which we computed the adjusted ORs that have been adjusted for other covariates, including possible confounders.

The analyses were performed for men and women separately due to the different pattern of significant predictors for each sex. Adjusted models were created for both sexes, and the variables having $p < 0.01$ in either one of the sexes were included in the final adjusted models. Unadjusted and adjusted ORs with 95% confidence intervals (CI) were computed. All statistical analyses were carried out using IBM SPSS Statistics for Windows V.26 and R V.3.6.1 (The R Foundation), with package ggplot2.^{38,39}

Patient or public involvement

The study was register-based and therefore, patients or members of the public were not involved in the study.

RESULTS

The demographics of the study population (n=14329) are presented in [table 1](#).

Overall, 67% of the students (n=9543) had graduated in the 6-year follow-up ([table 1](#) and [figure 1](#)). Some 72% of the women and 60% of the men had graduated. Of those graduating, 49% of the women and 52% of the men had completed only a bachelor’s degree. The proportion of the non-graduates over the 6-year follow-up was highest

Table 1 Demographics of the study population (n=14 329) by graduation during the 6-year follow-up and by sex

	Total (n=14 329)		Not graduated (n=4786)		P value
	Female (n=8075)	Male (n=6254)	Female (n=2275)	Male (n=2511)	
	%	%	%	%	
Age (years)					<0.001
17–21	65	66	27	39	
22–24	13	14	28	40	
25–29	11	11	33	42	
≥30	12	9	31	47	
Field of study					<0.001
Humanities, theology, philosophy	21	9	28	35	
Sports science, educational sciences, health sciences, psychology	16	8	18	37	
Technology and engineering	14	28	30	41	
Natural sciences, agriculture and forestry, and pharmacy	14	19	41	53	
Social sciences	12	9	21	32	
Business and economics	7	14	24	31	
Arts	5	3	30	35	
Medicine	4	3	50	53	
Law	3	2	18	28	
Other	4	5	30	43	

The proportion of non-graduates was calculated from the total number of students. The field of study is presented in descending order by the total number of female students. Differences between graduates and non-graduates were tested with the χ^2 test.

among medical students and lowest among law students (table 1).

Of the study population, 55% (n=7845) responded to the eHQ. Of the respondents, 43% were referred to a health check and 42% of those referred attended the health check (figure 1). Of the female eHQ respondents, 23% and of the non-respondents 37% had not graduated during the 6-year follow-up. The difference between female respondents and non-respondents was statistically significant ($p<0.001$). Correspondingly, among men, 32% of the respondents and 46% of the non-respondents had not graduated ($p<0.001$). Among women, 25% of the health check attendees and 32% of the non-attendees had not graduated ($p<0.001$). The proportions for men were 32% and 41% ($p<0.001$), respectively.

The eHQ respondents who reported high values in health-related and health habit-related questions during the first year of studies had graduated more often during the 6-year follow-up compared with those reporting low values (table 2). Of the students who reported high enthusiasm and high engagement in studies during the first year of studies, more than 80% had graduated, while among students reporting low values, fewer than half had graduated.

In the multivariable logistic regression model, the study fields of (1) medicine and (2) natural sciences, agriculture and forestry, and pharmacy were positively associated with non-graduation in both sexes (figure 2A). The

predictors in the eHQ associated with non-graduation differed among women and men. Among the female students, low enthusiasm about studies (OR 2.6, 95% CI 1.9 to 3.6), low engagement with studies (OR 2.5, 95% CI 1.8 to 3.4) and daily smoking (OR 1.9, 95% CI 1.4 to 2.6) were the strongest predictors of non-graduation. Among the male students, the predictors with the highest ORs for non-graduation were low engagement with studies (OR 3.7, 95% CI 2.5 to 5.5) and class II or III obesity (BMI \geq 35) (OR 4.0, 95% CI 1.9 to 8.8) (figure 2B).

Not attending the health check when referred was associated with non-graduation in both sexes (figure 2C). ORs for not graduating were 1.6 (95% CI 1.3 to 1.9) in women and 1.3 (95% CI 1.0 to 1.6) in men, respectively. The reference groups were the students who were considered not to have risk factors for study ability in the eHQ and had thus received electronic feedback supporting a healthy lifestyle. Attending the health check was not significantly associated with non-graduation in either sex.

Unadjusted and adjusted ORs for all predictors in the logistic regression models are presented in online supplemental file 2.

DISCUSSION

University entrants' low engagement and low enthusiasm about studies were the strongest predictors to non-graduation during the 6-year follow-up of this study. Of

Table 2 eHQ responses (n=7845) of the University entrants for the 2011–2012 academic year by graduation (graduated and not graduated) and by sex

eHQ responses	Female			Male		
	Total n	Graduated %	Not graduated %	Total n	Graduated %	Not graduated %
Studying						
Enthusiasm about the field of study on a –10 to +10 scale						
High 8–10	3057	84	16	1472	75	25
Medium 0–7	1788	70	30	1113	61	39
Low –10––1	291	47	53	124	33	67
Engagement with studies on a –10 to +10 scale						
High 8–10	1984	86	15	906	78	22
Medium 0–7	2790	74	26	1570	67	33
Low –10––1	362	51	49	233	34	67
Health habits						
Exercise						
Yes	4450	78	22	2241	70	30
No	686	70	31	468	58	42
Alcohol use						
Do not use	1046	75	25	490	67	33
AUDIT 1–7 points	3036	78	22	1160	68	32
AUDIT 8–15 points	940	75	25	932	68	32
AUDIT 16–19 points	73	80	21	78	67	33
AUDIT ≥20 points	41	61	39	49	59	41
Used/tried drugs						
No	4687	78	23	2340	69	31
Yes	449	71	29	369	59	42
Smoking or use of other tobacco products						
No	4216	78	22	1985	69	32
Occasionally	701	74	26	472	68	32
Daily	219	64	37	252	60	41
Healthiness of eating habits on a –10 to +10 scale						
High 8–10	1401	79	21	543	73	27
Medium 0–7	3272	77	23	1854	67	33
Low –10––1	463	67	33	312	60	40
Adequacy and quality of sleeping on a –10 to +10 scale						
High 8–10	1629	81	19	699	70	30
Medium 0–7	2623	77	23	1475	70	30
Low –10 to –1	884	68	32	535	58	42
Leisure time in terms of recovery, recreation and relaxation on a –10 to +10 scale						
High 8–10	2763	79	21	1250	69	31
Medium 0–7	2152	75	25	1347	68	33
Low –10 to –1	221	68	32	112	56	44
General health						
Reported chronic diseases						
No	4090	77	23	2221	69	31
Yes	1046	75	25	488	62	38

Continued



Table 2 Continued

eHQ responses	Female			Male		
	Total n	Graduated %	Not graduated %	Total n	Graduated %	Not graduated %
Reported persistent or recurrent symptoms						
No	3286	78	22	1990	69	31
Yes	1850	75	25	719	65	35
General health status on a -10 to +10 scale						
High 8-10	2601	81	19	1386	71	29
Medium 0-7	2223	74	26	1170	65	35
Low -10 to -1	312	64	37	153	55	45
Body mass index (n=7817)						
<18.5 (underweight)	358	75	25	80	64	36
18.5-24.99 (normal weight)	3944	78	22	1858	69	31
25.0-29.99 (overweight)	617	76	24	630	68	32
30.0-34.99 (obese, class I)	158	68	32	91	58	42
≥35 (obese, class II and III)	49	69	31	32	38	63
Dental health						
Latest dental check-up						
0-2 years ago	3397	77	23	1716	67	33
3-5 years ago	1518	77	24	804	68	32
More than 5 years ago	221	72	28	189	66	34
Eating and drinking times per day						
6 or less	4281	78	23	1983	68	32
7-10	814	74	26	659	68	32
More than 10	41	71	29	67	66	34
Teeth brushing						
Twice a day or more often	4145	78	22	1607	70	30
Once a day	964	73	28	1027	65	35
Less than once a day	27	78	22	75	43	57
Cavities that require filling at dental check-ups						
Never	1344	77	23	769	70	30
Seldom	2529	77	23	1403	68	32
Often or every time	1263	76	24	537	64	36
Dental fear						
Not at all	2869	76	24	1985	68	32
Some	1917	78	22	663	67	33
Very much	350	73	27	61	62	38
Mental well-being and social relations						
Normal attitude towards food						
Yes	4149	78	22	2526	68	32
No	254	64	36	31	55	45
Can't say	733	73	27	152	59	41
Usual state of mind on a -10 to +10 scale						
High 8-10	2134	81	19	1034	73	27
Medium 0-7	2656	76	24	1510	66	34
Low -10 to -1	346	60	40	165	53	47

Continued

Table 2 Continued

eHQ responses	Female			Male		
	Total n	Graduated %	Not graduated %	Total n	Graduated %	Not graduated %
Experience of loneliness on a -10 to +10 scale						
High 8-10	2548	79	21	1176	72	28
Medium 0-7	1904	76	24	1117	65	35
Low -10 to -1	684	71	29	416	61	39
Relationship with the parents on a scale -10 to +10						
High 8-10	3318	79	21	1718	71	29
Medium 0-7	1577	73	27	917	62	38
Low -10 to -1	241	72	28	74	66	34
Experiencing various social situations (eg, giving presentation) on a -10 to +10 scale						
High 8-10	1453	80	20	761	68	32
Medium 0-7	2537	79	21	1453	70	30
Low -10 to -1	1146	69	32	495	61	39
Other issues						
Presents willingness to discuss about sexual health						
No	4380	77	23	2599	68	32
Yes	756	74	26	110	68	32
Presents willingness to discuss about a non-specific matter						
No	4102	78	22	2314	68	32
Yes	1034	74	26	395	65	35

The proportions were calculated from the respective sex-based line total. The differences between the graduates and non-graduates by sex were tested with the χ^2 test, and only the significant ($p < 0.01$) results are shown. AUDIT, Alcohol Use Disorders Identification Test; eHQ, Electronic Health Questionnaire.

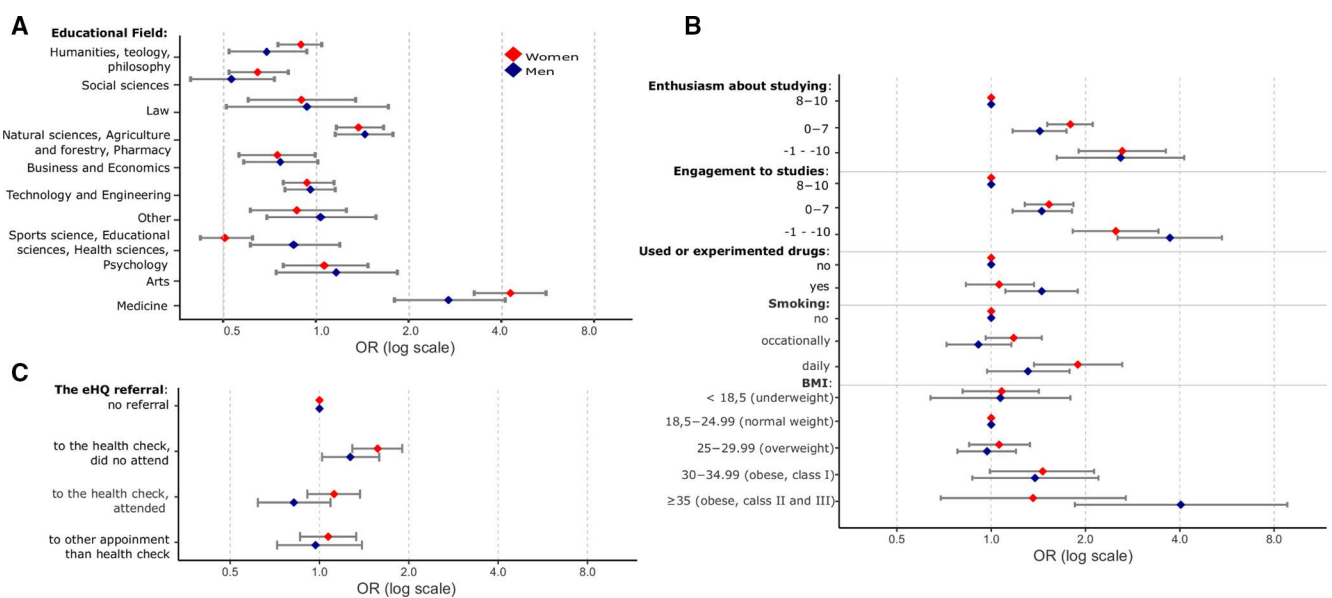


Figure 2 (A-C) OR plot with 95% CIs for associations between (A) the field of study, (B) eHQ responses, (C) the health examination process and non-graduation. The red plots indicate women and blue plots indicate men. The reference of the OR for field of study is the mean of all study fields. BMI, body mass index; eHQ, Electronic Health Questionnaire.

the health-related predictors, daily smoking in women and class II or III obesity ($\text{BMI} \geq 35$) and drug use in men were associated with non-graduation. By contrast, there was no association with mental well-being in either sex. Students who participated in the FSHS health examination process graduated more often than students who did not.

To our knowledge, this was the first study on factors associated with university students' graduation using such a wide selection of factors and a 6-year follow-up. For medical students, it seems the follow-up should have been longer since the curriculum is designed to take about six academic years. Medical students represent 3.5% of the study population; therefore, it is unlikely that the overall results were affected by this.

The major strengths of the study were the nationwide register data with good coverage and the high percentage of completed eHQs. The register data enabled the assessment of the national cohort of university entrants. The results may not be generalisable to university student populations in other countries due to different educational and healthcare systems.

The chosen outcome variable, graduation, is one of the clear strengths of the study. Gaining a degree is the main target of university education, and the registers are reliable on this achievement. In most previous studies, academic achievement has been measured by grade point average (GPA) or the students' self-estimate of their performance.^{17 40 41} In publicly funded universities, such as those in Finland, the importance of graduation is emphasised based on the effective use of public resources.

It is a strength that the study used data gathered in real life, in the relevant healthcare setting. This enables the immediate practical implementation of the results. Using real-life data also has limitations. The eHQ was developed for practical purposes and was validated accordingly and not to the degree of scientific rigour. The response rate to the eHQ was 55%, which is higher than that in national surveys conducted in the 20th century in the Finnish university student population.^{3 33}

Repeated reminders, a common practice in research settings using surveys, could have improved the response rate. Furthermore, the way the nurses interpreted the eHQ responses relied on their professional competence, and for example, specific cut-offs were available for only some of the questions.²⁴ The process as such had been in place for 2 years in 2011 and the professionals were routinely involved.

The eHQ data have the limitations of self-reported data and are therefore susceptible to bias.⁴² The somewhat complex response scale (-10 to $+10$) might have resulted in varying interpretations by the respondents.⁴³ The medical records of FSHS and the higher education achievement register are handled by humans and can therefore include errors. However, especially the higher education achievement register, in particular, is a reliable source of data on graduations, since this is also linked to the financing of the universities.

There is scarce evidence that is directly relevant to the findings of this study about the association between participating in the health examination process and graduation. We found that students who did not participate in the process at all, that is, the eHQ non-respondents, were the least likely to graduate in the 6-year follow-up. A previous study conducted on the same cohort as this study found that the non-respondents are healthier and have better health habits than the respondents.⁴⁴ Therefore, we may speculate that the reasons explaining their lower graduation rate are not health related. In the present study, the students reporting risk factors for study ability in the eHQ were referred to a health check: the non-attendees had significantly higher odds of not graduating in the 6 years. The students who only received electronic feedback and those who attended their designated health check similarly achieved graduation. This suggests that providing proactive feedback and psychoeducation for students at entry and conducting health checks to students indicating health risk factors may be helpful to academic performance.

It has been suggested that student healthcare questionnaires should include questions about studying.⁴⁵ The two study-related questions in the eHQ were both associated with graduation. The findings suggest that engagement and enthusiasm about studying in the first year are important predictors of graduation. It might be the case that students who felt they were in the wrong field of study or did not feel connected to the study community expressed low enthusiasm and low engagement. Detecting these problems early seems an important and potential intervention target. Introducing evidence-based intervention models as a collaboration of student healthcare and universities could be an effective method to address these problems.^{46–49}

We found that daily smoking in women and repeated drug use in men were associated with non-graduation. These findings are in line with previous research.^{29 50 51} Smoking and drug use may reflect poorer general life control or the lower socioeconomic status of the respondents, which could both have affected academic performance.^{52 53}

This study supports the findings of He *et al*, who reported in their meta-analysis about a weak negative correlation between BMI and academic achievement.²¹ They did not find any difference between the sexes, whereas in this study, the association between high BMI and non-graduation was found only in men. BMI in this study was self-reported. It is possible that weight was under-reported especially, in case of overweight women.^{54 55} The underlying mechanisms of this association remains unclear.

It was quite surprising that none of the questions about mental well-being and social relations were associated with non-graduation in the final models, even though the questions were associated in univariate models. The study of Vaez and Laflamme was performed in a quite similar setting in Sweden, and the outcome variable was also the similar: 'completion of a degree'.¹⁰ They neither found

an association between several psychological factors measured and academic achievement. Further, Topham and Moller did not find links between psychological well-being of students entering the university and academic achievement in the end of the first year.⁵⁶

On the contrary, Bruffaerts *et al* reported that freshmen with mental health problems have significantly lower academic functioning during the first year than other students.¹² Depression has been found to be associated with a decrease, and anxiety with an increase in GPA.^{15–41} Grøtan *et al* reported a strong association between symptoms of mental distress, academic self-efficacy and study progress.⁵⁷ In these studies, academic achievement was measured by short-term measures like GPA, whereas the present study and that of Vaez *et al* used a long-term outcome, graduation. The possibility of mental health issues having short-term effects without having long-term effects in academic achievement should be considered. This might be due to symptoms passing over time or as a result of treatment. It is also possible that the FSHS health examination process enhanced the detection and treatment of mental health issues, and therefore, no association with graduation was detected. In order to get a deeper insight, FSHS should in the future consider, including validated measures of mental health in the eHQ.

Student healthcare is primarily a preventive healthcare service. However, the need for medical service provision, especially in mental health issues, is currently considered critical and may therefore be prioritised over preventive measures. Motivating university entrants to improve their health habits may, in addition to health benefits, have a positive effect on academic achievement. Conducting health checks on a screened student population might be one effective way to do this. The findings of this study can be used to support and motivate the student healthcare personnel and management, as well as universities to invest more in preventive work.

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