



Financial difficulties and student health: Results from a National Cross-Sectional Survey of Norwegian college and university students

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A B S T R A C T

To examine financial circumstances among Norwegian higher education students and investigate associations between financial difficulties and health, academic outcomes and self-destructive behaviours, we used data from a recent national health survey from 2018 for higher education in Norway (the SHoT study). 50,054 full-time students (69.1% women; 30.9% men) aged 18–35 years participated and reported work status, income and experience of financial difficulties, self-reported mental health problems, deliberate self-harm and suicide attempts, somatic health complaints and exam failures in higher education. Students often experiencing financial difficulties ($n = 3933$, 7.9%) reported more mental health problems (HSCL-25; $M = 2.1$ vs 1.6), depression (24% vs 7.2%), anxiety (20.8% vs 6.7%), deliberate self-harm (12.2% vs 4.9%), attempted suicide (3.1% vs 0.5%), somatic health complaints (SSS8; $M = 13.1$ vs 7.4), having ever failed exams (45.5% vs 28.4%) and higher average number of failed exams ($M = 1.1$ vs 0.6) compared to peers not experiencing financial difficulties. These associations were robust to adjustments for age, gender, relationship status, immigrant background and study program. Strategies to alleviate problems associated with financial difficulties may be to improve the existing financial support to students, strengthen student mental health services, and expand services for financial counselling and guidance.

The social gradient in health (Chen et al., 2002; Marmot, 2005; Quon and McGrath, 2014; Reiss, 2013) is evident across a range of parameters, and those with lower education levels have poorer health, more chronic diseases and disabilities, and higher mortality rates (Avendano et al., 2009; Mackenbach et al., 2008). Recent years have seen a widening of access to higher education (Burke, 2013; Osborne, 2003; Salmi, 2018) across OECD countries; 35% of young people are now expected to obtain a tertiary education degree, with presumably high financial and social returns for the individual and society (The State of Higher Education 2015–16, 2017).

Despite numerous studies documenting health benefits associated with higher education, there is an emerging public health crisis among many of those in pursuit of higher education. Systematic reviews on student health have documented disturbingly high rates of mental health problems, in particular depression, anxiety and suicidal ideation (Rotenstein et al., 2016; Tung et al., 2018), exceeding estimates in age-matched peers and the general population (Dyrbye et al., 2006; Ibrahim et al., 2013; Leahy et al., 2010; Winzer et al., 2014). There are also suggestions that the number of students with mental health problems is rising (Knapstad et al., 2019; Sivertsen et al., 2019a; Storrie et al.,

2010). Challenging financial circumstances have emerged as one of the significant predictors of poorer health outcomes among higher education students (Eisenberg et al., 2013; Said et al., 2013; Steptoe et al., 2007).

Students accrue a sizeable debt during their education (Belfield et al., 2017), even in countries where higher education is free (State Educational Loan Fund, 2019), and students often worry about their economic circumstances (Brzezinski et al., 2018; Jones et al., 2018). In a 2018 survey of 3000 UK students, 3 in 5 reported that they worried about being able to pay back their loans, and more than 80% worried about not being able to cover living expenses (Savethestudent, 2018).

Objective financial indicators, such as size of debt and tuition fees, and problems paying bills have been shown to be associated with poorer health outcomes among students in higher education (Carney et al., 2005; Richardson et al., 2015; Walsemann et al., 2015), and low income has been related to self-harm, suicidal ideation and suicide attempts in this group (Toprak et al., 2011). Subjective feelings of financial stress and concerns about financial circumstances have also been linked to mental health problems and mental illness; to more aches, pains and reduced physical functioning; to sleep problems; and to worse general

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health among students (Cooke et al., 2004; Farrer et al., 2016; Jessop et al., 2005; Richardson et al., 2017; Stallman, 2010). Findings from some studies have suggested that there may be causal pathways from financial concerns to health (Andrews and Wilding, 2004; Jessop et al., 2020; Richardson et al., 2017, 2015), but there is a need for more studies into these associations to further establish their robustness (McCloud and Bann, 2019).

Besides negative associations with health, financial circumstances are also related to academic outcomes. Students experiencing financial difficulties and -stress have been found to have lower average grades (Harding, 2011), to perform poorer on examinations (Andrews and Wilding, 2004), to delay their graduation (Letkiewicz et al., 2014), and they have increased likelihood of dropping out from their education (Joo et al., 2008).

Most previous studies of the associations between financial difficulties and health- and academic outcomes have been conducted in countries such as the UK and US where higher education is largely funded by tuition (Johnson, 2019; Murphy et al., 2019) and where the general level of social inequality is higher (Alvaredo et al., 2017). In a recent rapid review of studies into financial stress among UK students, it was also expressed concerns that many prior studies have used small samples and were conducted at a single University, which may limit their generalizability (McCloud and Bann, 2019). In Norway, the site of the current study, higher education is offered for free by universities, specialized universities (e.g., education in arts, music, theology) and university colleges (focusing on undergraduate education), and for tuition at some private university colleges. Acceptance into higher education is offered after finishing upper secondary school, and in accordance with the Bologna process¹, students may take bachelor's degrees (3-4 years), master's degrees (2 years) and doctoral degrees (3-4 years). In 2018, 35.3% of 19-24-year-olds were enrolled in higher education (Statistics Norway, 2019). Loans and grants for living expenses are available through the State Educational Loan Fund, a government agency that allocates loans and grants to students in Norway, explicitly aiming to provide equal opportunities and access to education regardless of socioeconomic background (State Educational Loan Fund, 2019). Still, costs of living are often not covered in full by the financial support available, and in a recently conducted survey of financial circumstances among 800 18-30-year-old Norwegian students, 20-30% reported to have spent from their savings or used credit cards to cover living expenses (Johansen, 2018). Also, as much of the governmental financial support is loans based, students accrue substantial debt during their higher education. In 2018, the average loan after graduation in Norway was NOK 340,000 (approx. EUR 30,000/USD 33,000) (State Educational Loan Fund, 2019). Thus, there are reasons to believe that financial difficulties and stress is a concern also among students in Norway.

Within groups of students, several characteristics co-vary with health and academic problems and indicators of financial difficulties and may therefore confound their association. Studies have found that age, gender, relationship status, having children, divorced parents, immigrant background and length of study are associated to health and academic outcomes (Cvetkovski et al., 2012; Dyrbye et al., 2006; Eisenberg et al., 2013, 2013; Jones et al., 2018; Said et al., 2013; Soria and Linder, 2014). These same variables have also been found to be associated with different indicators of financial circumstances (Hayhoe et al., 2000; Mossakowski, 2008; Nelson et al., 2013; Robb, 2017; Robb and Sharpe, 2009).

Based on these considerations, we used data from a recent large national survey of full-time students (1) to examine financial circumstances among Norwegian higher education students, with particular attention to challenging circumstances, (2) investigate associations between financial circumstances and health and academic outcomes, and

(3) assess the robustness of these associations by adjusting for potential confounders such as age, gender, relationship status, having children, divorced parents, immigrant background and length of study. There are some noteworthy features of the current study that addresses some of the limitations of prior studies; the sample is recruited from all higher education institutions in Norway, it has a large number of participants, and we investigate both academic and health outcomes using established and validated instruments, while accounting for many potential confounding variables.

1. Methods

1.1. Study design and setting

The SHoT2018 study (Students' Health and Wellbeing Study) is a national student survey for higher education in Norway initiated by the three largest student welfare organizations (*Sammen* [Bergen and surrounding area], *Sit* [Trondheim and surrounding area] and *SiO* [Oslo and Akershus]). The SHoT2018 was collected electronically through a web-based platform. Details of the study have been published elsewhere (Sivertsen et al., 2019b). In short, the SHoT2018 was conducted between 6 February and 5 April 2018, and invited all full-time Norwegian students pursuing higher education (both in Norway and abroad).

1.2. Participants

All full-time Norwegian students aged between 18 and 35 taking higher education (both in Norway and abroad) received both an email and SMS (short message service) text invitation to take part in the study. For the SHoT2018 study, 162 512 students fulfilled the inclusion criteria, of whom 50 054 (30.8%) students completed the online questionnaires.

1.3. Instruments and measures

1.3.1. Demographic information (SHoT2018)

All participants indicated their sex and age and their study program ('One-year program', 'Bachelor (3-4 year)', 'Integrated master (5-6 years)' or 'Master (1.5-2 years)'). Participants were also asked about their household status (coded as 'living alone' vs 'living with others'), their relationship status (coded as 'single' vs 'married/partner' or 'girl-/boyfriend'), whether they had any children (yes' or no) and if their parents were divorced (yes' or no). Participants were categorized as an immigrant if either the student or their parents were born outside Norway.

1.3.2. Indicators of financial difficulties

The main indicator of *financial difficulties* in the current study was whether participants, during the last 12 months had experienced difficulties affording costs of living (such as for food, transportation and accommodation; 'never', 'rarely', 'sometimes', 'often'). Two additional items were included to assess the validity of the measure of financial difficulties; participants were asked whether they had paid work during the last year ('yes/no'), and what their net income was from paid work last year (NOK 0 - NOK 301 000 or more).

1.3.3. Mental health problems

1.3.3.1. *Symptoms of anxiety and depression.* Mental health problems were assessed using The Hopkins Symptoms Checklist (HSCL-25) derived from the 90-item Symptom Checklist (SCL-90), a screening tool designed to detect symptoms of anxiety and depression from the last two weeks. It is composed of a 10-item subscale for anxiety and a 15-item subscale for depression, with each item scored on a Likert scale from 1 ('not at all') to 4 ('extremely'). The period of reference is the last two

¹ https://ec.europa.eu/education/policies/higher-education/bologna-process-and-european-higher-education-area_en

weeks. An investigation of the factor structure based on the SHoT2014 data supported a uni-dimensional model in the student population (Skogen et al., 2017), which was also used in the current paper.

1.3.3.2. Self-reported depression and anxiety disorders. Mental and somatic conditions/disorders were assessed by a pre-defined list adapted to fit this age-cohort. The list was based on a similar operationalization used in previous large population-based studies (the HUNT study; Krokstad et al., 2013) and included several subcategories for most common conditions/disorders (not listed here). For mental disorders, the list comprised the following specific disorders/group of disorders: ADHD, anxiety disorder, autism/Asperger, bipolar disorder, depression, PTSD (posttraumatic stress disorder), schizophrenia, personality disorder, eating disorder, Tourette’s syndrome, obsessive compulsive disorder (OCD), and other. The list contained no definition of the included disorders/conditions. In the current study, depression and anxiety disorder were included.

1.3.4. Self-harm and suicidal behaviour

History of non-suicidal self-harm (NSSH) and suicide attempts were

assessed with two items drawn from the Adult Psychiatric Morbidity Survey (APMS) (McManus et al., 2014); ‘Have you ever made an attempt to take your life, by taking an overdose of tablets or in some other way?’, and ‘Have you ever deliberately harmed yourself in any way but not with the intention of killing yourself? (i.e., self-harm)’. If respondents answered yes to any item, the timing of the most recent episode was assessed, using the following response options: ‘last week’, ‘past year’, ‘more than a year ago, but after I started studying at the university’, and ‘before I started studying at university’. Respondents answering ‘before I started studying at university’ were excluded from the current analyses.

1.3.5. Somatic health complaints

Somatic health complaints were measured with the Somatic Symptom Scale -8 (Gierk et al., 2014). The scale consists of items measuring symptoms from the gastrointestinal system, pain in different parts of the body, headaches, dizziness, tiredness and low energy and problems sleeping the 7 last days, loading onto one general factor and three sub-factors (pain, cardiopulmonary and fatigue). It has shown good reliability and good convergent validity with depression, anxiety, general health status and health care use, and increases in severity score

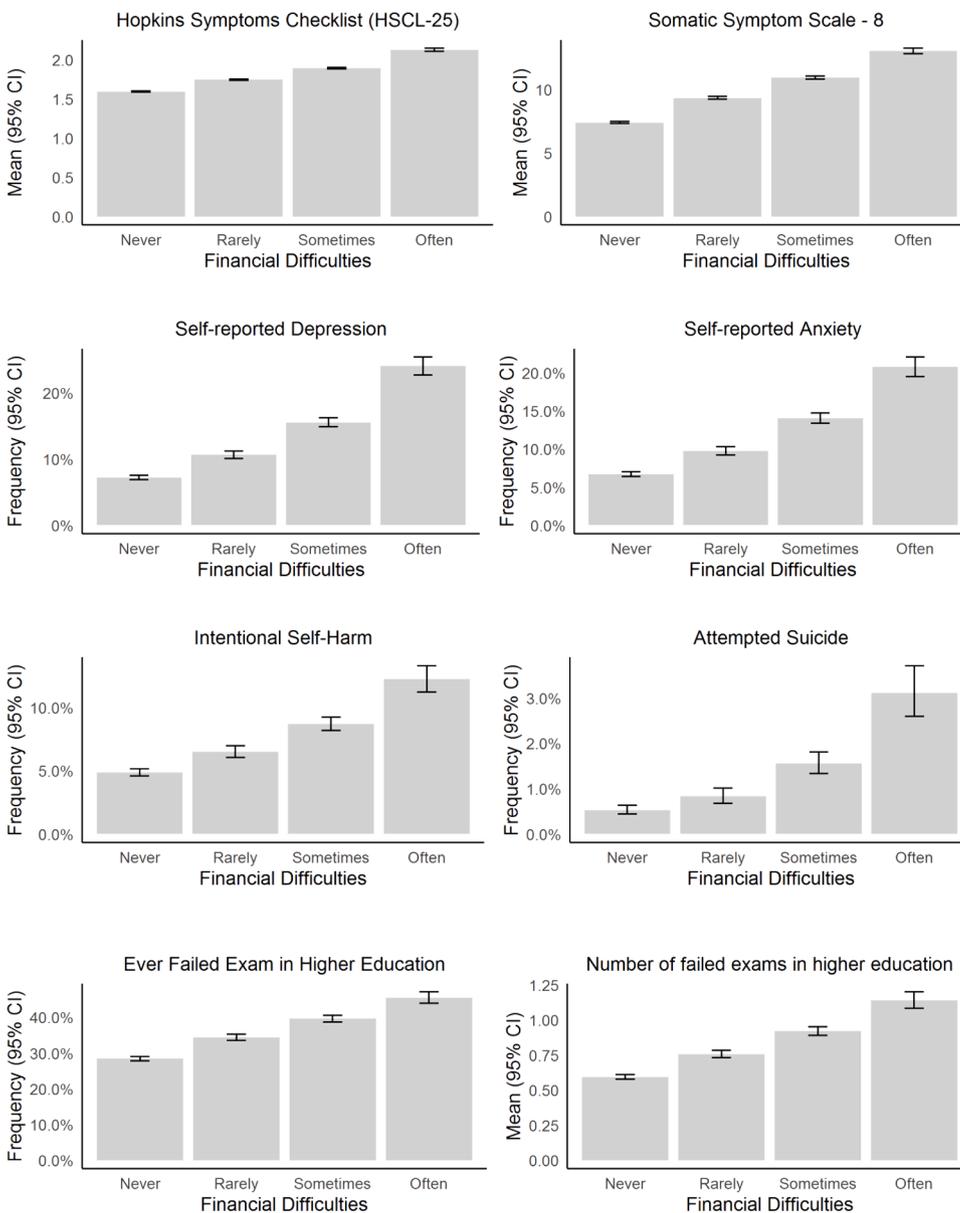


Fig. 1. Bivariate associations between financial difficulties and health and academic outcomes. **Note.** Height of bars represent mean/frequency of outcome in each category of financial difficulties. Error bars show 95% confidence interval of the mean/proportions. Y-scales are free to account for the different scales of the outcome variables. All *p*-values < .001 from omnibus statistical tests (ANOVA for continuous variables and Pearson’s chi-squared test for categorical outcomes) after corrections for multiple testing with the FDR method (Benjamini and Hochberg, 1995; Benjamini and Yekutieli, 2001).

(corresponding to percentile ranks) has been found to predict health care visits (Gierk et al., 2014).

1.3.6. Academic outcomes

Self-reported academic performance/failure was assessed with the following questions: 'Have you failed an exam after you started studying at your college/university?' with the response options 'no' (= 0) and 'yes' (= 1). If the response was 'yes', the student was then asked to indicate the number of times he/she had failed an exam (response options 1 to 10 or more times).

1.4. Ethics

The regional Committee for Medical and Health research ethics in Western Norway approved the SHoT2018 study (no. 2017/1176). Informed consent was obtained electronically after the participants had received a detailed introduction to the study.

1.5. Statistical analyses

Bivariate associations between financial difficulties and academic and health outcomes and self-destructive behaviours were tested using analysis of variance (for continuous outcomes), Pearson's chi-squared test (for categorical outcomes) and a negative binomial regression (for counts of exam failures) and are presented in Fig. 1. These associations were further assessed using regression models adjusted for demographic characteristics (age, relationship status, having children, gender, parental divorce, immigrant background and study program; Model 1s) and work status and income (Model 2s). Linear regression models were used for continuous outcomes, logistic regression modelling was used for binary outcomes, and a negative binomial model was used for counts of exam failures. Categorical predictors were dummy-coded, with the first level in the variable response set as the reference, and continuous variables were mean centred. To account for the clustered structure of the data (i.e. students nested within educational institutions) we calculated cluster-robust standard errors with the R package *sandwich* (Berger et al., 2017; Zeileis, 2006, 2004). All *p*-values were subsequently false discovery corrected for multiple testing with the "FDR"-method (Benjamini and Hochberg, 1995; Benjamini and Yekutieli, 2001). Analyses were conducted using R version 3.6.2 for Mac (R Core Team, 2019).

2. Results

2.1. Descriptive characteristics of the sample can be seen Table 1

The mean age of participants was 23.2 (*SD* = 3.3), the majority were female (69.1%) about 50% were single, and a minority had children (4.9%). One-third had divorced parents, and few had immigrant background (5.5-10.7%). The large majority of students were enrolled in a 3-4-year bachelor's degrees, 2 years master's degrees or 5-6 years integrated master's degrees. Part-time working was very common; 86% of the sample responded that they had paid work during the last year and the modal income in the sample was from 51-100,000 NOK [EUR 5,000-10,000/USD 5,500-11,000]. Less than 50% of the sample never experienced financial difficulties, and around 8% often experienced financial difficulties.

2.1.1. Financial difficulties and health and academic outcomes

The associations between financial difficulties and demographic characteristics can be seen in Table 2.

Students more frequently experiencing financial difficulties were slightly older, a higher proportion were female, they more often had children and divorced parents, and more had immigrant backgrounds. The agreement between the different indicators of financial circumstances was reasonable; among students who *often* experienced financial

Table 1
Descriptive characteristics of the sample.

	Overall N (%)	Missing (%)
Age (mean (sd))	23.2 (3.3)	1.4
Female	34437 (69.1%)	0.4
Relationship status (single)	24969 (49.9%)	0.0
Have children	2469 (4.9%)	0.3
Parents divorced	16806 (33.7%)	0.3
Foreign born (self)	2755 (5.5%)	0.5
Foreign born (mother)	4979 (10.0%)	0.6
Foreign born (father)	5335 (10.7%)	0.6
Study program		2.0
One-year program	2651 (5.4%)	
Bachelor (3-4 year)	30138 (61.4%)	
Integrated master (5-6 years)	10895 (22.2%)	
Master (1.5-2 years)	5396 (11.0%)	
Did not work	7075 (14.2%)	0.2
Income from work		3.6
< NOK 50,000	10360 (21.4%)	
NOK 51-100,000	17525 (36.3%)	
NOK 100-200,000	13631 (28.2%)	
> NOK 200,000	6793 (14.1%)	
Financial difficulties		0.3
Never	23740 (47.6%)	
Rarely	11348 (22.7%)	
Sometimes	10902 (21.8%)	
Often	3933 (7.9%)	

difficulties, more did not work (20.4% vs 13-14.7%) and fewer had high incomes from work (10.2% vs 13.5-14.9%) indicative of validity of the financial difficulties question.

The associations between financial difficulties and health and academic outcomes can be seen in Fig. 1.

A social gradient pattern emerged for all outcomes, with more favourable outcomes for students never experiencing financial difficulties compared to students experiencing financial difficulties more frequently. When comparing students *often* experiencing financial difficulties vs students *never* experiencing financial difficulties, the former had more symptoms of mental health problems (HSCL-25; *M* = 2.1 vs 1.6), a higher prevalence of depression (24% vs 7.2%), anxiety (20.8% vs 6.7%), deliberate self-harm (12.2% vs 4.9%) and attempted suicide (3.1% vs 0.5%), and more somatic health complaints (SSS8; *M* = 13.1 vs 7.4). The frequency of having ever failed an exam and the mean number of failed exams was also higher for students often experiencing financial difficulties (ever failed exam: 45.5%, number of failed exams: *M* = 1.1) compared to students never experiencing financial difficulties (ever failed exam: 28.4%, number of failed exams: *M* = 0.6).

These associations between financial difficulties and health and academic outcomes were robust to adjustments for demographic characteristics (age, gender, relationship status, having children, parental divorce, immigrant background) and study program. Contrasted with students never experiencing financial difficulties, students often having financial difficulties had more symptoms of mental health problems (HSCL-25; *b* = 0.49, 95% CI = 0.46 – 0.51), more somatic complaints (SSS-8; *b* = 5.04, 95% CI = 4.82 – 5.27), and were 2-3 times more likely to have a depressive disorder (OR = 3.55, 95% CI = 3.23 – 3.91), and anxiety disorder (OR = 3.13, 95% CI = 2.83 – 3.46). Students often having financial difficulties were also more than two times more likely to self-harm (OR = 2.42, 95% CI = 2.14 – 2.74), had increased odds of suicide attempts (OR = 5.14, 95% CI = 3.90 – 6.78) of ever having failed an exam (OR = 1.98, 95% CI = 1.83 – 2.13), and a higher incidence rate ratio (IRR) of exam failures (IRR = 1.87, 95% CI = 1.75 – 1.99), see Table 3, Model 1.

3. Discussion

Using a recent and very large national survey of higher education students, we investigated associations between financial difficulties and academic and health outcomes. The findings suggest that a considerable

Table 2
Bivariate associations between financial difficulties and demographic variables, economic indicators.

	Financial difficulties				P
	Never (N=23740) N (%)	Rarely (N=11348) N (%)	Sometimes (N=10902) N (%)	Often (N=3933) N (%)	
Age (mean (sd))	22.9 (3.2)	23.2 (3.2)	23.7 (3.4)	24.1 (3.6)	< .001 ¹
Female	15307 (64.7%)	8028 (71.0%)	8086 (74.5%)	2935 (75.1%)	< .001 ²
Relationship status (single)	12478 (52.6%)	5425 (47.8%)	5062 (46.4%)	1937 (49.2%)	< .001 ²
Have children	890 (3.8%)	521 (4.6%)	717 (6.6%)	337 (8.6%)	< .001 ²
Parents divorced	6590 (27.8%)	4058 (35.9%)	4293 (39.5%)	1828 (46.6%)	< .001 ²
Foreign born (self)	1140 (4.8%)	661 (5.8%)	646 (6.0%)	296 (7.6%)	< .001 ²
Foreign born (mother)	2203 (9.3%)	1154 (10.2%)	1117 (10.3%)	478 (12.2%)	< .001 ²
Foreign born (father)	2262 (9.6%)	1253 (11.1%)	1276 (11.8%)	519 (13.3%)	< .001 ²
Study program					< .001 ²
One-year program	1210 (5.2%)	626 (5.6%)	608 (5.7%)	204 (5.3%)	
Bachelor (3-4 year)	13340 (57.2%)	6908 (62.1%)	7161 (67.0%)	2651 (69.3%)	
Master (1.5-2 years)	2635 (11.3%)	1244 (11.2%)	1142 (10.7%)	368 (9.6%)	
Integrated master (5-6 years)	6157 (26.4%)	2346 (21.1%)	1770 (16.6%)	600 (15.7%)	
Did not work last year	3083 (13.0%)	1553 (13.7%)	1597 (14.7%)	801 (20.4%)	< .001 ²
Income from work					< .001 ²
< NOK 50,000	4756 (20.7%)	2279 (20.8%)	2237 (21.2%)	1072 (28.2%)	
NOK 51-100,000	8431 (36.7%)	3879 (35.4%)	3843 (36.5%)	1357 (35.7%)	
NOK 100-200,000	6353 (27.7%)	3245 (29.6%)	3040 (28.8%)	987 (26.0%)	
> NOK 200,000	3427 (14.9%)	1553 (14.2%)	1418 (13.5%)	387 (10.2%)	

¹ Note. Linear model ANOVA

² Pearson's Chi-squared test. P-values corrected for multiple testing with the FDR method.

Table 3
Regression models of the association between financial difficulties and health and academic outcomes.

	Predictor: Financial difficulties [§]								
	Rarely			Sometimes			Often		
	Estimates	95% CI	p-value	Estimates	95% CI	p-value	Estimates	95% CI	p-value
Independent variables									
HSCL-25 ^a	0.12	0.11 – 0.14	<0.001	0.26	0.25 – 0.27	<0.001	0.49	0.46 – 0.51	<0.001
SSS-8 ^a	1.59	1.46 – 1.72	<0.001	3.05	2.91 – 3.20	<0.001	5.04	4.82 – 5.27	<0.001
Depressive disorder ^b	1.43	1.32 – 1.56	<0.001	2.12	1.97 – 2.29	<0.001	3.55	3.23 – 3.91	<0.001
Anxiety disorder ^b	1.37	1.26 – 1.49	<0.001	1.99	1.84 – 2.16	<0.001	3.13	2.83 – 3.46	<0.001
Self-harm ^b	1.26	1.14 – 1.40	<0.001	1.74	1.58 – 1.91	<0.001	2.42	2.14 – 2.74	<0.001
Suicide attempt ^b	1.45	1.09 – 1.95	0.025	2.78	2.17 – 3.58	<0.001	5.14	3.90 – 6.78	<0.001
Failed exam (ever) ^b	1.31	1.25 – 1.38	<0.001	1.59	1.51 – 1.67	<0.001	1.98	1.83 – 2.13	<0.001
Number of failed exams ^c	1.27	1.21 – 1.33	<0.001	1.52	1.45 – 1.59	<0.001	1.87	1.75 – 1.99	<0.001

[§] Note. Reference category: Never experienced financial difficulties

^a Coefficients from multiple linear regression analysis

^b Odds-ratios from logistic regression analysis

^c Incidence rate ratios from negative binomial regression analysis. P-values from cluster robust standard errors subsequently corrected for multiple testing with the FDR-method (Benjamini and Hochberg, 1995; Benjamini and Yekutieli, 2001). Estimates are adjusted for age, relationship status, having children, gender, parental divorce, immigrant background and study program.

number of students sometimes or often struggle to make their financial ends meet and there was a consistent pattern with more mental and somatic health problems among students who experienced financial difficulties more frequently. Associations were robust to adjustments for age, gender, relationship status, having children, parental divorce, immigrant background and study program.

While the majority of students (70%) reported that they never or rarely experienced financial difficulties, 30% reported such experiences sometimes or often. Being older, female and foreign born, and having children and foreign-born parents were characteristics associated with experiencing financial difficulties more often, as was being enrolled in a bachelor's relative to a master's and an integrated master's degree. These findings are generally in line with characteristics associated with having financial difficulties identified in previous studies (Hayhoe et al., 2000; Heckman et al., 2014; Mossakowski, 2008; Nelson et al., 2013; Robb, 2017; Robb and Sharpe, 2009), although methodological differences in measuring and conceptualizing financial difficulties does not allow for direct comparisons of results.

Previous investigations among Norwegian students have also documented that females and older/more senior students more often have

financial difficulties than males, possibly related to higher expenses related to costs of housing and living (Barstad et al., 2012). The same Norwegian survey also documented that students from families with higher socioeconomic status received more economic support from their families (Barstad et al., 2012). Immigrants in Norway more often have low income and challenging economic circumstances compared to the majority population (Thorsen, 2019). One potential explanation for why students with immigrant backgrounds experience financial difficulties more often could therefore be that they receive less economic support from their families. Having children was also associated with experiencing financial difficulties more often, perhaps related to higher expenses for families with children and fewer opportunities for parents to work.

The strong association between health and academic outcomes and financial difficulties was visible in the pattern of results; for students who never experienced financial difficulties, the mean level of symptoms of mental health problems was below the conventional cut-off point (1.75) indicating mental disorder (Sandanger et al., 1998) and the level of somatic health problems corresponded to a low severity (Gierk et al., 2014). The prevalence of self-reported depression and anxiety were in

line with, or slightly lower than previous estimates of current self-reported depression and anxiety from Norwegian community samples (Bonsaksen et al., 2019, 2018), and the prevalence of self-harm and suicide attempts was lower than estimates previously reported from student samples (Borrill et al., 2009; Serras et al., 2010; Sivertsen et al., 2019a; Whitlock et al., 2011, 2006). Around one-third of the participants reported ever having failed an exam, and the mean number of failed exams was less than one. According to the Norwegian national database for higher education, around 7-8% of students in higher education failed an exam each year in the period of 2010-2018 (NSD, 2019). This suggests that the number of reported failures in the current study is reasonable, given the varying levels of student experience in the sample (from first year students to students in master's degrees).

Students who experienced financial difficulties more often experienced more health problems and poorer academic outcomes, in line with findings from previous studies (Eisenberg et al., 2013; Farrer et al., 2016; Jessop et al., 2020; Richardson et al., 2017; Steptoe et al., 2007). For students often experiencing financial difficulties, their mean symptom level of mental health problems was above the cut-off indicating mental health disorder and the mean level of somatic symptoms corresponded to a high severity (Gierk et al., 2014; Sandanger et al., 1998). The prevalence of self-reported depression and anxiety was approximately three times as high as previous reports from Norwegian community samples (Bonsaksen et al., 2019, 2018). Self-harm was 2.5 times more common, and suicide attempts 6 times more common compared to students never experiencing financial difficulties, and similar associations with economic problems have been reported previously in samples of Turkish college students (Assari, 2018; Toprak et al., 2011).

Students often experiencing financial difficulties were almost twice as likely to have failed an exam and to have failed twice as many exams as their peers without financial difficulties. These results are in line with previous studies indicating poorer academic outcomes associated with financial difficulties (Andrews and Wilding, 2004; Harding, 2011; Joo et al., 2008; Letkiewicz et al., 2014).

The associations between financial difficulties and adverse outcomes found in the current study may be interpreted from three broad viewpoints (Lynch and von Hippel, 2016); 1) a *social selection perspective*, that is, students with varying degrees of health problems and difficult financial backgrounds are increasingly pursuing higher education which has become more accessible (Currie, 2009; Osborne, 2003); 2) a *social determinants perspective* that suggests that financial difficulties may cause some students to develop health problems (Jessop et al., 2020; Richardson et al., 2017) possibly through adverse environmental exposures, risky health behaviours, allostatic load, or epigenetic processes (Braveman and Gottlieb, 2014); or 3) a third variable relating both to health and financial outcomes, such as cognitive endowments or personality factors (Conti and Heckman, 2010).

The current study is cross-sectional, thereby precluding interpretations of the results with regards to causality. It is also possible that the associations between financial difficulties and health problems are bidirectional, the mental health problems may be a consequence of the strained economy or health problems may contribute to students' financial difficulties, perhaps by preventing them from working (Richardson et al., 2017). We did, however, measure problems currently experienced by the students; Financial difficulties were measured over the last 12 months, mental health problems for the last two weeks, somatic symptoms for the last seven days, we only asked about higher education exam failures, and questions of self-harm and suicide attempts were limited to those responding that this had happened after they started their higher education. Still, we cannot determine from our data whether students came from financially challenged family backgrounds or if they had poorer health and academic performance prior to enrolment into higher education. We are also unable to investigate whether the associations between financial difficulties and health and academic outcomes are related to third variables such as personality or cognitive endowments. Still, if such problems were pre-existing, they were at least

not disabling enough to prevent the participants from pursuing higher education.

A potential relevant third variable could be related to time management skills while in higher education, although we did not measure this in the current study. More effective time management has been related to better academic performance and lower levels of mental health problems, such as anxiety (Adams and Blair, 2019). Better time management skills could enable students to combine their academic studies with some work, presumably alleviating their financial stress somewhat, and a good work-study balance could also be advantageous to their academic performance (Dundes and Marx, 2006).

The findings from this study also suggest that further studies are needed in order to determine whether there really is a general higher education student health crisis (i.e., are there particular risks associated with simply being a higher education student), or whether we are simply "rediscovering" social inequalities in a new population. The findings from the current study may indicate the latter, as they suggest that students without financial difficulties fare considerably better with regards to their health and academic outcomes. Detailed investigations into how risk factors and adverse outcomes may be socially stratified, in particular in socioeconomically heterogeneous populations like students, may reveal health inequalities that may otherwise be hidden, and contribute to identify groups of students with particularly risky profiles that may be targeted for intervention.

Finally, the current study raises important questions about whether these financial problems are of a transitory nature, maybe related to the current economic challenges and potential stresses associated with being enrolled in higher education. If so, we may expect that the health problems are alleviated when students graduate and gain full employment and (for most) improved financial circumstances. This would reconcile the findings from the current study with the many other studies that demonstrate the longer-term benefits of higher education (Avendano et al., 2009; Mackenbach et al., 2008).

3.1. Methodological considerations

One of the main limitations of the current study is the modest response rate and overrepresentation of female respondents which may limit the generalizability of the findings to the whole student population. Also, the information material of the SHoT2018-study focused much on "how are students really doing?", and one may speculate if this would lead to a higher participation rate of individuals who felt that the topic was of particular relevance to them. Indeed, people are in general more prone to participate in a survey if the topic is relevant to them personally (Edwards et al., 2009). This potential selection bias may in particular affect the occurrence (or prevalence) of problems but is less likely to influence the estimated associations between financial difficulties and health and academic outcomes. The low response rate may be related to use of the web-based survey as electronic platforms may result in lower participation rates than paper based surveys or face-to-face interviews (Dykema et al., 2013).

Another limitation is the reliance on cross-sectional data which limits us from drawing any conclusions related to the causal (or potential bidirectional) nature of the relationship between financial difficulties and health and academic outcomes. Students' perceptions of financial difficulties may be a mediator of the association between objective indicators of financial circumstances and health and academic outcomes (Jessop et al., 2005) and there may be time-varying interactions between predictors and outcomes (Richardson et al., 2017) that we were unable to investigate with cross-sectional data. Two research strategies that could shed light on the causal nature of these associations are 1) longitudinal studies where they monitor participant health, academic achievement and financial difficulties from early childhood and through higher education, and 2) randomized controlled intervention studies where they manipulate student financial status (either through cash transfers, subsidised housing or other means of

financial support) and monitor potential changes in health and academic outcomes in comparison to a control group not receiving such transfers.

Finally, all data was self-reported which may have inflated the strengths of the associations between the independent and dependent variables (Podsakoff et al., 2003). Among the strengths of the study are the considerable sample size, the use of validated instruments for measuring mental health problems and somatic problems and using an established instrument to measure suicide attempts and self-harm.

3.2. Study implications

The findings from the current study do suggest that there may be a need to increase financial support to students. This could be done directly, by providing increased student loans and scholarships, or indirectly by giving systematic and mandatory student discounts for merchants and service providers. The State Educational Loan Fund offers at most NOK 110,200 [EURO 11,000/USD 12,000] in loans and grants (with some additional support available for full-time students), but it is estimated that students need more to cover their actual expenses (estimated to NOK 121 220 [EURO 12,000/USD 13,000] for the academic year 2019-2020).

Student welfare organizations could also provide more courses on budgeting or financial planning, as it has been documented that students with financial difficulties are more likely to graduate if they met with a financial advisor (Letkiewicz et al., 2014). Studies also document benefits of effective time management skills (Adams and Blair, 2019), and it has been suggested that universities and student welfare organisations should more actively teach time management skills to first-year students (Meer et al., 2010). There is also a need for higher education faculty to be aware of the high rate of financial difficulties and associated adverse outcomes among their students, and to provide them with appropriate tools to help students address these issues (Becker et al., 2002; Kitzrow, 2003).

As knowledge about effective interventions are scarce in this area, it would be wise to implement any interventive efforts in a manner that could be evaluated, either using well-designed experimental approaches or adequately powered nonrandomized alternative designs that can properly account for selection effects and provide appropriate control of confounding factors (Henry et al., 2017; Shadish, 2011).

Declaration of Competing Interest

All authors declare no conflict of interest.

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