Life satisfaction among adolescents before and during the COVID-19 pandemic

ORIGINAL ARTICLE

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BACKGROUND

The COVID-19 pandemic in the spring of 2020 involved closure of schools and strict limitations on social contact. The study examines whether this had an effect on the life satisfaction and subjective well-being among adolescents.

MATERIAL AND METHOD

An online survey among students in lower secondary schools in Oslo (N = 8 116, 46 % response rate) was conducted during the period with closed schools and strict infection control measures. The results were compared to equivalent surveys conducted in Oslo in 2018 (N = 13 790, 83 % response rate) and several other counties in 2020 before the COVID-19 restrictions were introduced (N = 19 799, 49 % response rate). Identical measurements were used for life satisfaction, subjective well-being and background factors. We used logistic regression analysis and corrected for sociodemographic differences.

RESULTS

Among boys, the proportion reporting high life satisfaction (a score of 6 or higher on a scale from 0 to 10) declined markedly, from 88 % in 2018 and 92 % in 2020 before the COVID-19 restrictions to 71 % during the period of restrictions (p < 0.001). The equivalent figures for girls were 78 %, 81 % and 62 % (p < 0.001). The social inequality in life satisfaction was smaller during the restrictions than in other periods. Concerns about illness and infection were associated with lower life satisfaction.

INTERPRETATION

The reduction in life satisfaction and subjective well-being can most likely be explained by the heavy restrictions placed on activities that promote well-being and by concerns about infection. The results also indicate that resourceful adolescents experienced an especially strong reduction in their life satisfaction.

Main findings

Adolescents in Oslo reported a marked reduction in life satisfaction and subjective well-being after the introduction of restrictions due to COVID-19.

The socioeconomic resources of adolescents were to a lesser degree related to their life satisfaction during the COVID-19 restrictions than prior to these.

Concerns about illness and infection associated with COVID-19 were related to lower life satisfaction.

The measures to limit the spread of infection during the COVID-19 pandemic have intruded on all our lives. Young people have been particularly affected. Schools closed on 13 March 2020 in Norway, and strict restrictions were imposed on leisure activities and physical contact with friends and peers (social distancing). We have previously known little about the effect that such large-scale outbreaks of disease and their concurrent social restrictions have on well-being [1]. We therefore aimed to examine whether life satisfaction and other indicators of well-being changed during the strict COVID-19 restrictions that were imposed. For this purpose we used three large-scale surveys among adolescents, one of which was conducted after the introduction of the strict restrictions in the spring of 2020, and two previous studies.

The COVID-19 restrictions may conceivably have had considerable negative consequences for the well-being of young people. With schools closed and major social restrictions in place they may have missed out on experiences that can offer self-realisation and affirmation. Social distancing may have caused isolation and loneliness, which are risk factors for discontent and mental health afflictions [2]. Furthermore, many may have felt uncertain and anxious about infection and illness, which may negatively affect the quality of life and well-being of young people. Many have also been concerned that people with few resources would be especially vulnerable during the COVID-19 pandemic, which potentially could increase social inequalities in terms of well-being and mental health [1, 3]. We therefore also aimed to investigate whether social inequality in life satisfaction and subjective well-being had increased.

Although the COVID-19 restrictions may have had numerous negative consequences, other factors may have pulled in the opposite direction and helped improve well-being. Home schooling on digital platforms and less physical interaction with other students may have produced fewer expectations in daily life and less pressure and stress. The COVID-19 restrictions may have led to less pressure on body image, less bullying and less drug use. This might have counteracted poorer well-being.

In this study we focused on subjective well-being, i.e. how life is perceived [4]. Key aspects are life satisfaction, positive emotions and a sense of coping and meaning [4]. Life satisfaction is a key indicator in this study, but we also examine other aspects of subjective well-being. In previous studies, adolescents in Norway have reported high life satisfaction, and these findings have

remained stable in recent years (5). For example, more than 80 % of the lower secondary school students reported high life satisfaction in the Norwegian HBSC study (6). The oldest teenage girls and adolescents in economically straitened families reported somewhat lower levels of life satisfaction (5, 6).

We aimed to examine whether the high levels of subjective well-being have persisted through the pandemic and whether the social inequality in life satisfaction changed after the introduction of the restrictions related to COVID-19. We also asked whether concerns for infection or illness were associated with life satisfaction, and whether changes in the family's situation, such as lay-offs or unemployment of parents or more quarrels in the home, had any bearing on life satisfaction.

Material and method

Procedure and participants

We used data from the surveys *Oslo-ungdom i koronatiden [Adolescents in Oslo in the time of the coronavirus], Ung i Oslo 2018 [Young in Oslo 2018]* and *Ungdata 2020*. All the surveys encompassed students in lower and upper secondary schools, but because of the higher response rate we only used data from lower secondary schools. *Oslo-ungdom i koronatiden* was undertaken from 23 April to 8 May 2020. When the survey started, all schools in Norway had been closed for approximately six weeks, and all schools in Oslo had switched to digital home teaching. Strict restrictions had been imposed on organised leisure activities and physical interaction with persons outside the family (social distancing). The study was conducted by Norwegian Social Research (NOVA) at Oslo Metropolitan University in collaboration with the city of Oslo educational administration. All state schools in Oslo were asked to participate by setting aside 30 minutes of home teaching for the study. Of the entire student population of Oslo, 46 % of the students at lower secondary level participated (N = 8 116).

The *Ung i Oslo 2018* study was conducted in the spring of 2018 (5). The target group included all students at lower secondary level, and 83 % of them participated (N = 13 790). *Ungdata 2020* was conducted in schools in the counties of Trøndelag, Innlandet and former Buskerud. When the COVID-19 restrictions were introduced and all schools closed, the study was terminated on 13 March 2020. Of the entire student population in these counties, 49 % participated (N = 19 799). Both of these studies were conducted in the classroom with an adult present.

We investigated whether the samples differed in terms of socioeconomic status. In the two surveys conducted in Oslo, there were minor differences in the proportions of adolescents living in families with the lowest socioeconomic status (2018: 7.4 % and 2020: 7.5 %). In the Ungdata 2020 study, on the other hand, only 2.8 % of the adolescents came from families with the lowest socioeconomic status (p < 0.001).

In all the studies, the students were provided with written information on the objective of the study in question and that participation was voluntary. All parents were informed in advance. The studies were anonymous and exempt from approval by the Regional Committee of Medical and Health Research Ethics.

Variables

Life satisfaction and other aspects of subjective well-being. In all three studies, life satisfaction was measured by means of Cantril's ladder [7]. This instrument is widely used both in Norway and internationally [6]. Participating adolescents were asked to rank their satisfaction with their own life on a scale from 0 (the worst possible life) to 10 (the best possible life). As in other studies [6], we distinguished between adolescents with high life satisfaction (a score of 6 or higher) and other adolescents (a score of 5 or lower). In addition, we included six question items based on a report from the Norwegian Directorate of Health on measurement of subjective well-being [4]. The questions measure positive emotions and perception of coping and meaningfulness during the preceding week, with response categories ranging from 1 (not at all) to 5 (all the time). Those who answered 'often' or 'all the time' were categorised as having a high score and contrasted with all the other adolescents. These questions were asked only in the 2020 studies and are listed in Tables 1 and 2.

Table 1

Prevalence of high life satisfaction and subjective well-being among boys in lower secondary school in Oslo in 2018, in three Norwegian counties (Trøndelag, Innlandet and former Buskerud) in 2020 prior to the COVID-19 restrictions and in Oslo in 2020 during the COVID-19 restrictions. N is unweighted.

	2018[1] Oslo (N = 6 788) % (n)	2020[2] Three Norwegian counties before COVID-19 (N = 9 792) % (n)	2020[2] Oslo during COVID-19 (N = 3 562) % (n)
Life satisfaction (Cantril's ladder)	88 (5 226)	92 (8 873)	71 (2 064)
During the last week, how often have you …			
felt happy	—	82 (7 948)	68 (1 938)
felt engaged	—	66 (6 262)	48 (1 348)
felt energised	—	64 (6 106)	50 (1 418)
felt optimistic about the future	—	59 (5 530)	47 (1 329)
felt useful	—	61 (5 735)	42 (1 186)
felt able to cope with things	—	68 (6 347)	52 (1 493)

[1]In 2018, the six questions on subjective well-being were not included

Tabell 2

Prevalence of high life satisfaction and subjective well-being among girls in lower secondary school in Oslo in 2018, in three Norwegian counties (Trøndelag, Innlandet and former Buskerud) in 2020 prior to the COVID-19 restrictions and in Oslo in 2020 during the COVID-19 restrictions. N is unweighted.

	2018[1] Oslo (N = 6 942) % (n)	2020[2] 2020[1] Three Norwegian counties before COVID-19 (N = 9 670) % (n)	2020[2] Oslo during COVID-19 (N = 4 474) % (n)
Life satisfaction (Cantril's ladder)	78 (4 977)	81 (7 721)	62 (2 443)
During the last week, how often have you ...			
felt happy	—	70 (6 668)	59 (2 355)
felt engaged	—	49 (4 605)	34 (1 325)
felt energised	—	50 (4 743)	41 (1 616)
felt optimistic about the future	—	42 (3 919)	36 (1 415)
felt useful	—	40 (3 754)	29 (1 140)
felt able to cope with things	—	42 (3 906)	33 (1 298)

[1]In 2018, the six questions on subjective well-being were not included

Sociodemographic variables. Sex and grade level were measured in all studies. The parents' socioeconomic status was measured in terms of a) the number of parents with higher education, b) the number of books in the home on a six-point scale ranging from 0 to >1 000, and c) average score on a four-part instrument, the Family Affluence Scale II, with questions about the number of cars and computers in the family, the number of holiday trips and whether the respondents have their own bedroom (8). The three variables were scaled from 0 to 3, and an average score constructed (8). In the studies in Oslo, we asked for grades achieved in English, Norwegian and mathematics, and calculated an average score. Immigrant background was defined as having two foreign-born parents (only in Oslo).

Concerns and changes to everyday life. In *Oslo-ungdom i koronatiden* we asked how adolescents assessed their everyday life in the period after the schools closed. We asked these questions: On a scale from 1 (not concerned at all) to 4 (very concerned), how concerned are you about a) falling ill yourself, b) your family or friends falling ill, and c) infecting others. We calculated an average score for the three questions. The students were also asked whether or not their family members were quarrelling more after the COVID-19 pandemic had started, with response alternatives ranging from 1 (much less than before) to 5 (much more than before), and whether one or both parents had lost their job or been laid off.

Analyses

Because of the varying response rates and differences in sociodemographic factors between the samples, we weighted the data for 2020 by key sociodemographic variables such as grade level and socioeconomic status using *Ung i Oslo 2018* as a basis. The two weighted data sets for 2020 thus had the same distribution of these background characteristics as the 2018 data set. The time of the survey was dummy coded in two variables with the data set from 2020 collected during the COVID-19 pandemic as a reference category. Changes in life satisfaction were investigated by means of logistic regression analysis and using the two dummy variables for time as predictors. We estimated the interaction terms between the time of the survey and sociodemographic characteristics and included them in the logistic regression analyses to test for interactions.

Results

Tables 1 and 2 show the proportion with high scores on life satisfaction and the questions on subjective well-being. The results indicate a clear decline in life satisfaction during the COVID-19 pandemic when compared to data for adolescents in Oslo in 2018 and three Norwegian counties in 2020 before the introduction of the restrictions. The proportion of boys with a high score on life satisfaction fell from 88 % (Oslo 2018) and 92 % (three Norwegian counties prior to the restrictions) to 71 % in Oslo during the COVID-19 restrictions. The decline amounted to as much as 17 and 21 percentage points (Table 1). The proportion of girls with a high score on life satisfaction fell from 78 % (Oslo 2018) and 81 % (three Norwegian counties prior to the restrictions) to 62 % in Oslo during the COVID-19 restrictions, a decline of 16 and 19 percentage points (Table 2).

When using life satisfaction as a continuous indicator and estimating the average and standard deviation (SD) for life satisfaction, we found the same pattern. The average for boys was then 7.45 (SD 1.86) in Oslo in 2018, 7.91 (1.75) in three Norwegian counties in 2020 prior to the restrictions and 6.54 (2.06) in Oslo in 2020 during the restrictions. The equivalent figures for girls were 6.94 (1.98), 7.18 (1.93) and 6.05 (1.96). For all of the six indicators of subjective well-being we could see the same decline from the measurements made prior to the COVID-19 restrictions (Tables 1 and 2). Logistic regression

analyses showed that the differences in well-being before and during the COVID-19 restrictions were statistically significant for all indicators of well-being and for both sexes (p < 0.001).

Furthermore, we investigated whether social inequality in well-being had increased or decreased during the COVID-19 pandemic. For this analysis we used the indicator of life satisfaction. The results of logistic regression analyses showed a clear social gradient in life satisfaction both among boys (Table 3) and girls (Table 4). Adolescents from families with low socioeconomic status and adolescents with poor grades had an increased risk of poorer life satisfaction both in 2018 and before the COVID-19 restrictions in 2020. The differences by socioeconomic status were, however, considerably reduced during the COVID-19 pandemic, although they remained statistically significant (note that the reduction in the odds ratio for socioeconomic status was small between 2018 and 2020 in Oslo for boys). There were no or only minor differences in life satisfaction between adolescents from immigrant backgrounds and other adolescents. Figure 1 shows a graphical presentation of social inequality in life satisfaction. The proportion with high life satisfaction remained stable at a low level in all three studies among adolescents with the poorest grades and those from a low socioeconomic background. In contrast, there were fewer who reported high life satisfaction during the COVID-19 restrictions among those with good grades and those from families with a high socioeconomic status.

Table 3

Results of the bivariate logistic regression analyses of the association between sociodemographic indicators (immigrant background, socioeconomic status, school grades) and life satisfaction for boys. OR = odds ratio, CI = confidence interval.

	2018 Oslo (N = 6 788) OR (95 % CI)	2020[1] Three Norwegian counties before COVID-19 (N = 9 792) OR (95 % CI)	2020 Oslo during COVID-19 (N = 3 562) OR (95 % CI)	Test for differences in the association	
				2018 versus during COVID-19 – P-value	2020 before COVID-19 versus during COVID-19 – P-value
No immigrant background	(Reference)				
Immigrant background	0.72 (0.61–0.85)	—	0.91 (0.78–1.07)	0.049	
Socioeconomic status (0–3)[2]	1.56 (1.38–1.75)	2.37 (2.12–2.64)	1.41 (1.24–1.60)	0.262	< 0.001
School grades (1–6)[2]	1.60 (1.46–1.75)	—	1.16 (1.06–1.28)	< 0.001	

[1]In 2020 prior to the COVID-19 restrictions, immigrant background and school performance was not measured.

[2]Socioeconomic status and school grades are scored so that the odds ratio is an expression of the difference that occurs in the odds when these variables change by one unit (one score in the measure of socioeconomic status or one school grade)

Table 4

Results of the bivariate logistic regression analyses of the associations between sociodemographic indicators (immigrant background, socioeconomic status, school grades) and life satisfaction for girls. OR = odds ratio, CI = confidence interval.

	2018 Oslo (N = 6 942) OR (95 % CI)	2020[1] Three Norwegian counties before COVID-19 (N = 9 670) OR (95 % CI)	2020 Oslo during COVID-1919 (N = 4 474) OR (95 % CI)	Test for differences in the association	
				2018 versus during COVID-19 – P-value	2020 before COVID-19 versus during COVID-19 – P-value
No immigrant background	(Reference)				
Immigrant background	0.88 (0.78–1.00)	—	0.99 (0.86–1.15)	0.224	
Socioeconomic status (0–3)[2]	1.64 (1.50–1.79)	1.93 (1.78–2.10)	1.15 (1.03–1.28)	< 0.001	< 0.001
School grades (1-6)[2]	1.51 (1.40–1.62)	—	1.17 (1.07–1.27)	< 0.001	

[1]In 2020 prior to the COVID-19 restrictions, immigrant background and school performance were not measured.

[2]Socioeconomic status and school grades are scored so that the odds ratio is an expression of the difference that occurs in the odds when these variables change by one unit (one score in the measure of socioeconomic status or one school grade)
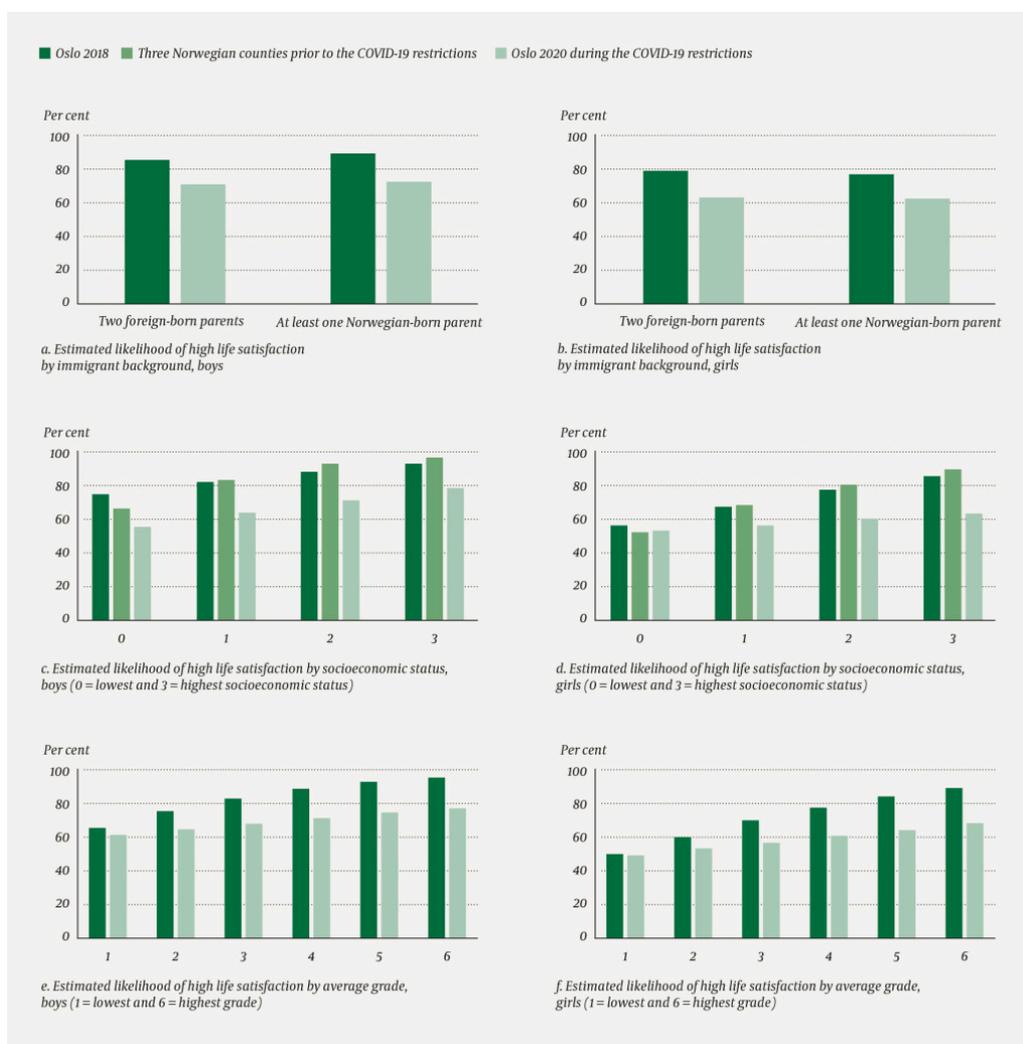
Figure 1 Social inequality in life satisfaction in 2018 (Oslo), in 2020 prior to the COVID-19 pandemic (Trøndelag, Innlandet, former Buskerud counties) and in 2020 during the COVID-29 pandemic (Oslo) for boys and girls.

Finally, we investigated whether concern about and negative consequences for the family during the COVID-19 pandemic were related to life satisfaction. Logistic regression analyses showed that concerns associated with the COVID-19 pandemic predicted lower levels of life satisfaction (Table 5). Altogether 30 % of the boys and 29 % of the girls reported fewer quarrels during the COVID-19 pandemic than usual, 50 % of the boys and 44 % of the girls reported the same as usual and 21 % of the boys and 27 % of the girls reported more quarrels. More quarrelling was related to lower life satisfaction. Those whose parents had become unemployed or laid off also reported lower satisfaction, but this effect was statistically significant only among the boys.

Table 5

Logistic regression analyses of how the experiences of young people during the COVID-19 restrictions are associated with life satisfaction. Boys and girls separately. OR = odds ratio, CI = confidence interval.

	Boys (N = 3 562) OR (95 % CI)	Girls (N = 4 474) OR (95 % CI)
Concerns because of the coronavirus crisis[1]	0.90 (0.80–0.98)	0.87 (0.79–0.96)

	Boys (N = 3 562) OR (95 % CI)	Girls (N = 4 474) OR (95 % CI)
Parents unemployed or laid off because of the coronavirus crisis	0.79 (0.68–0.92)	0.87 (0.73–1.03)
Quarrelling in the family[2]	0.72 (0.66–0.78)	0.72 (0.68–0.78)

[1]Concern assessed on a scale ranging from 1 (not concerned at all) to 4 (very concerned).

[2]Quarrelling assessed on a scale ranging from 1 (much less than before) to 5 (much more than before).

We re-ran all analyses by using multiple logistic regression analysis based on an unweighted data set with control for grade level and socioeconomic status, as well as by using linear regression analysis with a continuous variable for life satisfaction. When compared to the original analyses, the results were robust, with only minor changes to the estimates.

Discussion

We have used data collected from several thousands of adolescents both before and during the COVID-19 pandemic to investigate the effect of the comprehensive infection control measures on subjective well-being. Despite the strict measures taken during the COVID-19 pandemic, a significant majority reported fairly high scores on well-being. The findings nevertheless point to a strong decline in life satisfaction and other aspects of subjective well-being among both boys and girls. Most surprisingly, the social inequalities in life satisfaction were reduced. On the other hand, concerns about the COVID-19 pandemic and increased quarrelling in the family during the pandemic were associated with lower life satisfaction.

We used identical questions in the surveys, a well-established indicator of life satisfaction, supplemented by questions that measured other aspects of subjective well-being. The difference can thus not be attributed to variation in the wording of questions. However, the study has some methodological limitations. In the context of home teaching during the COVID-19 restrictions, the students may have answered the questionnaire differently from the other surveys, which were conducted in schools. Moreover, the study conducted during the COVID-19 pandemic has a lower response rate. We believe the reason is that some teachers were unable to implement the survey at relatively short notice. In addition, the context was less structured than it would have been in the classroom. Furthermore, the students came from different populations – Oslo versus three other Norwegian regions. We adjusted for key variables such as socioeconomic status and grade; however, other selection factors may have gone unmeasured. It is possible that participation was higher among vulnerable students than among other students, because the former may have been more concerned about the COVID-19 restrictions. On the other

hand, the rate of attrition tends to be highest among persons with numerous ailments and poor well-being (9). On the whole, it appears unlikely that the marked decline in life satisfaction during the COVID-19 restrictions is only due to a selection effect.

Moreover, we only investigated students in lower secondary schools. Students at the upper secondary level normally report poorer well-being (5, 6), but they were not included. Nor did we include school drop-outs, who are likely to constitute an especially vulnerable group.

The social inequality in life satisfaction declined considerably during the restrictions. The results indicate that young people in families with a high level of resources were more negatively affected. This may be because they normally participate more frequently in organised sports and other stimulating leisure activities (8). The disappearance of activities that provide enjoyment and meaning in everyday life will therefore affect privileged adolescents in particular. The study may indicate that the marked social differences in life satisfaction that are normally observed can be reduced by including children and adolescents from less resourceful homes in such leisure activities.

In addition, lower life satisfaction is linked to concerns about infection risk as well as to negative changes in the family due to the COVID-19 pandemic. Here we have no comparable data from the time before the pandemic, and it remains unclear whether these factors have had a direct impact on life satisfaction. There is nevertheless good reason to keep an eye on adolescents who are thus affected.

The study indicates that the COVID-19 restrictions have led to a considerable decline in subjective well-being among adolescents. Many adolescents were afflicted by this, and we should therefore focus on young people who are struggling. Moreover, life satisfaction is correlated with mental health problems, such as symptoms of anxiety and depression (10). There is thus reason to assume that the prevalence of mental health problems also may have increased.

The pandemic will continue to affect us, even though schools have reopened. If the infection resurfaces, we will need effective restrictions that do not involve excessive costs in terms of well-being and mental health. To achieve this, we need solid evidence-based knowledge about this topic to be able to design appropriately dimensioned interventions.

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