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The mental distress of our youth in the context of the COVID-19 pandemic

A retrospective cohort study of child and adolescent psychiatric emergency contacts before and during the COVID-19 pandemic in the Canton of Zurich from 2019 to 2021

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Summary

BACKG ROUND: Epidemiological evidence from population-based surveys suggest that the psychological well-being of adolescents has been severely affected by the COVID-19 pandemic itself, as well as by the safety measures implemented. The rationale of the study was to investigate the influence of the pandemic on psychiatric emergency service use, psychiatric admissions rates, emotional well-being, suicidality and self-harm behaviour in help-seeking children and adolescents.

METHODS: Retrospective cohort study of electronic patient records before and during the COVID-19 pandemic from the emergency out-patient facility of the department of child and adolescent psychiatry and psychotherapy of the Psychiatric University Hospital Zürich. The frequency of all emergency service contacts from 1 January 2019 to 31 June 2021 were described and the frequency of records compared in half-year intervals. Emotional well-being, behavioural problems, suicidality and self-harm were estimated based on the mental state examination notes of electronic patient records from the 1 March to the 30 April for the years 2019, 2020 and 2021.

RESULTS: After an initial decline in emergency contacts at the beginning of the first lockdown, the use of the centralised emergency service increased during the subsequent months and has since stabilised at a significantly higher level than before the pandemic. Comparison of emergency contacts in the first half of 2019 with the first half of 2021 shows that the number of emergency phone contacts nearly doubled, emergency outpatient assessments increased by 40%, emergency bridging interventions increased by 230%, and inpatient admissions of minors to adult psychiatric inpatient units more than doubled because of lack of service capacity in child and adolescent psychiatry. The proportion of adolescents who reported suicidal ideation increased significantly by 15%, from 69% to 84%, and the proportion of adolescents who reported self-harm behaviour increased by 17%, from 31% to 48%.

CONCLUSION: We found a significant increase in psychiatric service use, as well as in reported serious mental health symptoms such as suicidality and self-harm behaviour in help-seeking children and adolescents in the course of the pandemic. The child and adolescent psychiatric healthcare system is overburdened and down-referral of adolescents in need of ongoing therapy is becoming increasingly difficult. We recommend prioritising preventive and therapeutic measures to support the mental health of our children and adolescents alongside the somatic management of the COVID-19 pandemic.

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Introduction

In Switzerland, emergency measures were put in place from March 2020 onwards and adapted in due course to manage the COVID-19 pandemic. The aim of these measures was to counteract the spread of the coronavirus and, above all, to protect at-risk groups from the potentially lethal or long-term consequences of COVID-19, as well as to prevent a collapse of the healthcare system. Measures included hygienic recommendations such as hand washing and hand disinfection, mandatory mask-wearing, and physical distancing. The elementary schools were closed in March 2020, reopened at the end of May 2020 and largely remained open afterwards. Teaching switched to home-schooling, and leisure activities in groups were drastically curtailed. Many parents had to work from home, which posed great challenges for both parents and children, especially at the beginning of the pandemic. Mothers in particular had to cope with double burdens by taking over some of the school duties [1]. Some professional sectors such as the cultural industry and gastronomy nearly came to a complete standstill, which meant a great deal of uncertainty and insecurity for affected families. Daily life in Switzerland had not been restricted to this extent since the Second World War.

Initially, the focus in terms of mental health was on the older generation, which from one moment to the next had to restrict all social contacts. International representative

studies at the beginning of the pandemic show a steep increase in depressive and anxiety symptoms, as well as more psychological stress in general [2, 3]. In March and April 2020 depressive disorders amongst adults increased up to three-fold in the US and Europe [4–7]. In a survey of adults with more than 36,520 participants in the United Kingdom, the greatest increase in psychopathology, especially depression and anxiety disorders, was found in the early stages of the first lockdown. Particular risk factors for poor mental health were female gender, young age, low level of education, low income, pre-existing mental illness and having to care for younger children alone. Follow-up studies suggest that the more risk factors are aggregating, the worse the outcome [8]. However, with progressive relaxation of lockdown restrictions, psychological distress appeared to return relatively quickly to pre-lockdown levels for adults, only to increase again with the next lockdown.

A different pattern emerged in children, adolescents and young adults. It soon became apparent that adolescents and young adults are among the most vulnerable groups. A series of population-based studies in normal populations (see table 5 in [9]) showed an increase in psychopathology in the course of the pandemic. A representative Swiss study [1, 10] by the Department of Child and Adolescent Psychiatry and Psychotherapy of the Psychiatric University Hospital of Zurich and La Source (HES-SO) Lausanne showed that children, adolescents and young adults, as well as their parents, seemed to suffer from the uncertainties and lack of daily routine (normally provided primarily by the school). Girls in particular showed an unexpected increase in irritability and subjectively perceived stress. In the parent survey, mothers reported significantly more stress than fathers. A significant increase in problematic Internet use and concentration disorders was observed in children, adolescents and young adults in the general population, in particular in those who had already received psychiatric treatment [10, 11]. Another population-based study from the Zurich Children's Hospital showed an age-related increase in psychopathology, although there was also a subgroup of adolescents who appeared to benefit during the pandemic [11, 12]. Two nationwide population-based surveys across all age groups by de Quervain et al. confirmed these findings [13, 14]. In a subanalysis of high school students, more severe depressive symptoms than before the pandemic were reported and this persisted in the second round of interviews in early 2021. Students attributed these symptoms to school stress following the initial lockdown (specifically to missed classes due to school closures or quarantine measures). Other students reported concerns about their future academic and career prospects. Students were also worried that their peer relationships suffered as a consequence of the pandemic. Factor analysis confirmed that these stressors were associated with depressive symptoms.

A recently published systematic meta-analysis [15] found an association between initial school lockdowns and a decrease in emergency consultations among children and adolescents. The reason cited was the decreased pressure to perform in school assessments and the elimination of potential stress from social problems already existing prior to the lockdown. Furthermore, school closures and the associated longer sleep hours may have contributed to an improvement in psychological well-being [16–18]. However, the quarantine measures may have also contributed to a delay in necessary psychiatric evaluations, which could help to explain the significant increase in emergency consultations following relaxation of safety restrictions [15].

The US Centers for Disease Control and Prevention [19] examined emergency psychiatric consultations for suspected suicide attempts among persons aged 12 to 25 years between 1 January 2019 and 15 May 2021. During the first lockdown in the US from 29 March to 25 April 2020, significantly fewer individuals visited emergency departments for mental health problems compared with the corresponding period in 2019. In due course, the number of emergency psychiatric consultations for suspected suicide attempts in the US among adolescents began to rise and has remained consistently high for both genders (compared with 2019, 26.2% higher in 2020 and 50.6% higher in 2021 [19]). Much of this increase is attributed to emergency consultations by female adolescents. The trend in the US among children and adolescents is thus opposite to that seen in adults, namely an increase rather than a decrease in mental health problems following relaxation of the COVID-19 safety measures [20].

To our knowledge, there are no published Swiss data on the influence of the COVID-19 pandemic on child and adolescent emergency psychiatric service use or serious mental health symptoms in help-seeking children and adolescents. However, these data have been requested by the Swiss Federal COVID19 task force as well as by local authorities (*kantonale Gesundheitsbehörden*). Furthermore, the public impression is that children and adolescents with mental health problems have had more and more difficulties in getting access to professional psychiatric care since the summer of 2020. However, no systematic data on the influence of the COVID-19 pandemic and its measures on child and adolescent psychiatric service use have been published in Switzerland so far.

The objective of this retrospective survey was to obtain a better understanding of the influence of the COVID-19 pandemic and related measures on psychiatric emergency service use by adolescents. Additionally, we examined the influence of the COVID-19 pandemic on the mental health of these help-seeking children and adolescents. We hypothesised that the number of psychiatric emergency telephone contacts, emergency assessments and emergency admissions increased after the first lockdown and has remained unexpectedly high since then. Furthermore, we hypothesised a relative increase in psychopathology, in particular in suicidality and self harm in help-seeking youth.

Methods

Study design

We performed a retrospective file audit of all consequtive emergency contacts with the centralised emergency service *(Krisen-, Abklärungs-, Notfall- und Triagezentrum KANT)* of the Department of Child and Adolescent Psychiatry and Psychotherapy of the Psychiatric University Hospital Zurich between 1 January 2019 and 30 June 2021. To investigate the impact of the COVID-19 pandemic and related protective measures, we conducted a descriptive analy-

sis of the number of telephone contacts, emergency outpatient assessments, emergency follow-up assessments until regular outpatient treatment could be established (also called emergency bridging interventions) and emergency admissions to child and adolescent psychiatric acute care inpatient units. Furthermore, we analysed the number of emergency admissions of minors to adult psychiatric acute care inpatient units due to a lack of capacity in child and adolescent psychiatry. In addition to the quantitative analyses of service use, the impact of the pandemic on serious mental health symptoms was estimated based on the clinical characteristics mentioned in the electronic patient files. In particular the presence of suicidal ideation and self-harm behaviour were recorded (as present or not).

Setting

The Department of Child and Adolescent Psychiatry and Psychotherapy of the University Hospital Zurich (CAPS) consists of eight outpatient clinics, four day clinics, a child psychiatric inpatient facility with a total of 31 inpatient beds and an adolescent psychiatric inpatient facility with a total of 30 inpatient beds. The centralised child and adolescent psychiatric emergency service (KANT) was established in 2011 and has not changed its structure since 2018 (except that the number of employees has been extended owing to increased demands). KANT provides outpatient emergency assessments and crisis interventions (over the telephone as well as face-to-face), emergency admissions of minors in need of inpatient treatment to child and adolescent inpatient units, as well as emergency admission to adult psychiatric inpatient units if no age appropriate inpatient care is available (notworthy is that the state of Zurich had a shortage of child and adolescent psychiatric in- and outpatient services already prior to the pandemic, which was further exaggerated in the course of the pandemic).

Participants

The participants were children and adolescents in a crisis seeking help at the centralised emergency service KANT of the canton of Zurich. The catchment area of the centralised emergency service KANT covers the whole canton of Zurch (with approximately 1.5 million inhabitants). Usually KANT is first contacted by telephone. Referrers can be the child or adolescent, parents or guardians, school councellors, paediatricians, treating psychologists, psychotherapista, counselling services, non-government organisations working with children or youth, police, legal authorities *(Kindes und Erwachsenschutzbehörden KESB)* . Reasons for referrals are mostly risk assessments because of suicidality, also, rarely, because of threat towards others or severe mental health symptoms that cannot wait for a regular appointment (e.g., exacerbation of an eating disorder, severe forms of clinical depression, emerging psychotic disorders, trauma-related disorders or recurrent severe panic attacks resulting in repeated somatic emergency consultations).

Data source, variables and analysis

The total number of 8423 electronic patient records of all consecutive emergency contacts from 1 January 2019 to 30 June 2021 were exported out of our electronic clinical information system (Agfa Orbis). Each of these emergency contacts is recorded in separate reports with special forms for a telephone contact, an emergency outpatient assessment, a bridging intervention, or an emergency admission to child and adolescent psychiatry, as well as a special transfer form for minors admitted to adult psychiatry.

One objective of the study was to provide a valid representation of the change in emergency centre use before and during the COVID-19 pandemic (number of emergency contacts). Another was to capture and report clinical correlates related to service use.

First we performed a comprehensive descriptive analysis of the frequency of service use based on means of use (see table 1). In a second analysis, we examined the number of emergency admissions of minors in need of inpatient treatment. The latter data give insights into the timepoint at which the inpatient child and adolescent psychiatric care system became overburdened and adolescents in need of inpatient treatment needed to be admitted to adult psychiatric services.

In a third in-depth analysis we performed a file audit to describe the clinical characteristics for the time periods from 1 March to 30 April of the years 2019, 2020, and 2021 using the same methodology as in a previously published international cohort study [21]. Clinical characteristics were examined on the basis of the written emergency outpatient examination reports, particularly the mental state examinations. Suicidal ideation and self-harm were categorised as present or not (yes/no). Diagnoses were recorded and pooled as follows: presence of an emotional disorder (ICD-10 F3, F4, F93), conduct disorder (F90, F91), or other disorders (psychotic disorders, eating disorders, neurodevelopmental disorders, somatoform disorders, or personality disorders). A detailed list of variables assessed in the file audit in the context of the third in-depth analysis can be found in the appendix [21].

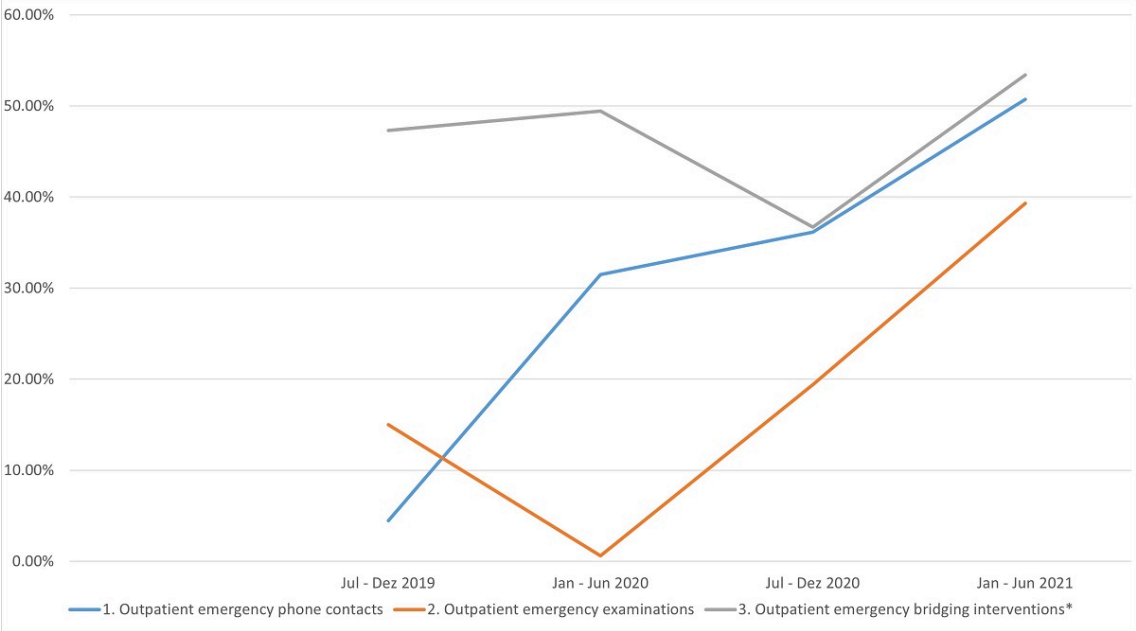
Statistical methods

The data was analysed using the Statistical Package for Social Sciences (SPSS), version 27. Number of emergency contacts, emergency outpatient assessments, bridging interventions and emergency admissions during different time periods are listed using descriptive statistics in absolute values, as well as in percentages in relation to the age corrected population of the corresponding time periods (see table 1). Clinical characteristics of the patients treated during the three time periods (March / April 2019; 2020; 2021) were compared using chi-square analysis and analysis of variance for categorical and continuous variables, respectively. Statistical significance was set at $p < 0.05$ (see table 3).

Risk of bias

As all emergency contacts with the centralised emergency service KANT between 1 January 2019 and 30 June 2021 were included in the analysis, we consider the risk of a selection bias to be minimal. However, it is important to be aware that the cohort consisted out of a help-seeing group of children and adolescents attending a psychiatric emergency service (not a random sample of a population or a less acute sample of non-help seeking minors).

Figure 1: % Change of emergency contacts compared to period of previous year. % Change: difference from the period of the previous year divided by period of the corresponding previous year.



Results

Emergency contacts from 1 January 2019 to 30 June 2021

After a very brief decline in service use during the initial 2 months of the first lockdown (in particular of outpatient emergency examinations), the centralised emergency centre KANT has seen a significant and ongoing increase in both telephone contacts, outpatient emergency assessments, outpatient bridging interventions and inpatient admissions since the second wave of the coronavirus pandemic (tables 1 and 2 and fig. 1). Compared with the first 6 months in 2019, the number of telephone contacts in the equivalent time period in 2021 nearly doubled (from 880 to 1744). Outpatient emergency assessments also increased by 40% (from 321 to 450). Particularly notable was the 230% increase in emergency bridging interventions (from 89 to 204), which we interpret as a result of the increasing difficulty in transferring mentally ill adolescents to a regular outpatient treatment in a timely manner.

Emergency admissions of minors to adult psychiatry

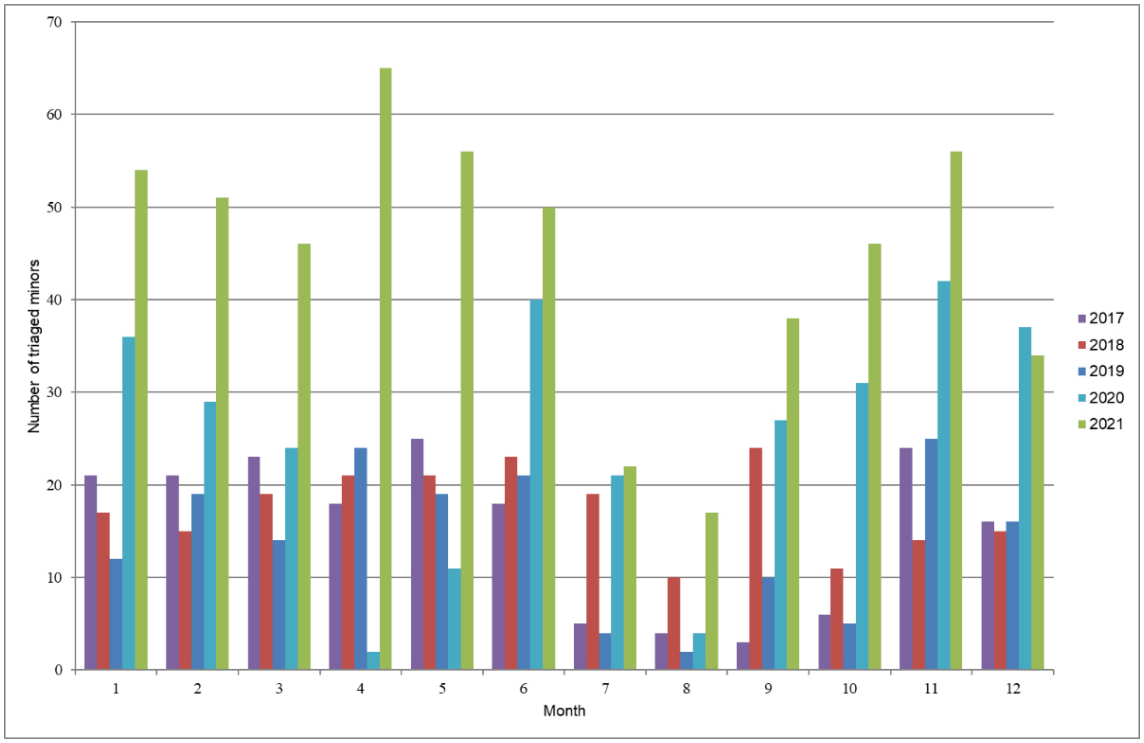
In the canton of Zurich, minors are admitted to adult psychiatry only when inpatient admission can no longer be averted and immediate treatment in a child and adolescent psychiatric inpatient unit is not possible owing to the lack of capacity (other cantons in Switzerland have different strategies, such as early discharge of less severely ill patients and/or the creation of overbeds within child and adolescent psychiatric units). However, in the state of Zurich minors are admitted into adult services only if there is an acute threat, usually in the context of acute suicidality, or

Table 1:
Emergency contacts with the Central Emergency Service of the state of Zurich.

	Jan–Jun 2019	Jul–Dec 2019	Jan–Jun 2020	Jul–Dec 2020	Jan–Jun 2021
1. Outpatient emergency telephone contacts	880	935	1157	1273	1744
2. Outpatient emergency examinations	321	299	323	357	450
3. Outpatient emergency bridging interventions[1]	89	109	133	149	204
Total emergency contacts (1–3)	1290	1343	1613	1779	2398
Inpatient admissions of minors to adult psychiatry due to child and adolescent inpatient shortages	109	62	142	162	316
Total number of days of minors in adult psychiatric inpatient units	784	340	1630	1411	3345
Mean time per patient in adult psychiatry (days)	7.51	5.19	12.06	8.19	10.49
Bed occupation total (%)	98.4	96.4	95.5	94.6	100.0
– Youth inpatient units (%)	101.2	95.9	95.0	95.7	99.5
– Child inpatient units (%)	95.7	96.8	96.1	93.4	100.5
Population of 10–18-year-olds of the canton of Zurich	126,439	127,051	129,485	129,870	131,759
Outpatient emergency telephone contacts in relation to population in %	0.7%	0.7%	0.9%	1.0%	1.3%
Outpatient emergency examinations in relation to population in %	0.3%	0.2%	0.2%	0.3%	0.3%
Outpatient emergency bridging interventions[1] in relation to population in %	0.1%	0.1%	0.1%	0.1%	0.2%
Inpatient admissions of minors to adult psychiatry due to child and adolescent inpatient shortages in relation to population in %	0.086%	0.049%	0.110%	0.125%	0.280%

[1] Emergency bridging interventions are follow-up assessments in the emergency department until the outpatient clinic can take over the patient for regular care

Figure 2: Emergency admissions of minors requiring inpatient treatment in adult psychiatry. In the canton of Zurich, minors requiring inpatient treatment are referred to adult psychiatry only if no less restrictive means are possible.



if the support system is overwhelmed by the adolescent's psychopathology to such an extent that admission is judged to be the least restrictive alternative measure. Figure 2 shows that admissions to adult psychiatric inpatient units dropped to negligible levels in the first 2 months of the first lockdown in April 2020 (dark blue bar), only to increase steadily with the deconfinement measures and the second wave. Especially after the summer vacation in 2020, there was a significant increase in emergency admissions of adolescents to adult psychiatry, as the child and adolescent psychiatric inpatient units became overburdened, which remained steadily high until the end of June 2021 (with a occupation rate of above 100% in the child and adolescent acute inpatient units from the Universty Psychiatric Clinic Zurich for nearly a year,until the end of June 2021). There was a dramatic increase of inpatient admissions of minors of the canton of Zurich to adult psychiatry from 0.110% of the adolescent population in need of inpatient treatment in the first half of 2020 to 0.125% in the second half of 2020 to 0.280% in the first half of 2021 (see table 1). A large proportion of severely mentally ill adolescents could no longer be accommodated in the child and adolescent psychiatric inpatient units. The majority had first to be hospitalised in adult inpatient psychiatric units, despite three other child and adolescent psychiatric hospitals, in addition to our institution, who all have a care mandate for minors of the canton of Zurich (the adolescent department of the Integrated Psychiatry Winterthur; the Sonnenhof Clinic in Ganterschwil (SG) and the inpatient child and adolescent psychiatry of the Clienia Littenheid (TG)). From October 2020 until June 2021, at any time between 30 and 60 minors had been hospitalised in adult psychiatric inpatient units until they could either be discharged or transferred to a child and adolescent psychiatric inpatient unit.

Clinical characteristics (March/April 2019, 2020, and 2021)

To gain a better understanding of the underlying causes of this increase in emergency contacts, relevant sociodemographic and clinical characteristics of affected children and adolescents were systematically collected from electronic patient records for the months of March/April of the years 2019, 2020 and 2021 (table 2, fig. 3). The index months (March/April) were selected because the first lockdown in Switzerland was initiated in March 2020 and compared with the same time period of the previous year (2019) and the following year (2021).

Outpatient emergency consultations

In March/April 2019, there were 109 outpatient emergency consultations. During the first lockdown in March/April 2020, there were only 86 consultations. In contrast, in March/April 2021 the number increased to 164, which is 1.5 times more than in 2019 and almost 2 times more than in March/April 2020.

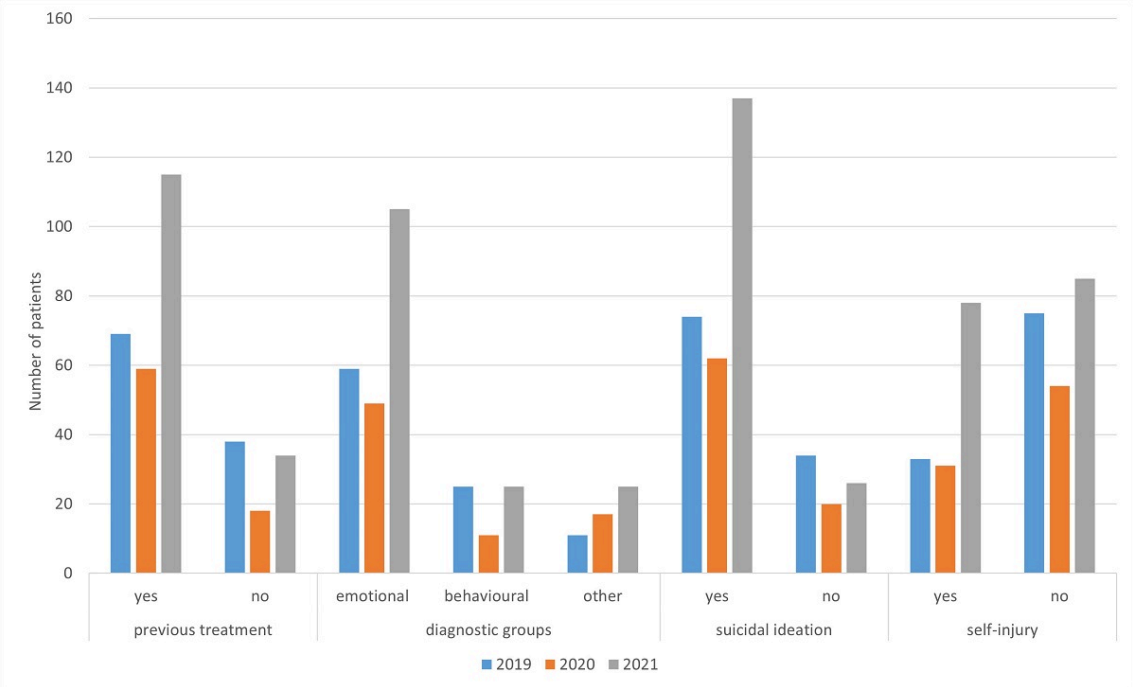
Age, sex

The proportion of female patients slightly increased from 56.6% in 2019 to 64.2% in 2021, although this difference was not statistically significant ($\chi^2 = 2.03$, $p = 0.363$). The mean age also did not differ significantly between the three time periods.

Previous psychiatric treatments

There was an increase in emergency consultations among patients who had already been treated for mental health

Figure 3: Previous psychiatric treatments, diagnostic group, suicidal ideation and self harm. Emotional disorders (F3, F4, F93), behavioural disorders (F90, F91)



problems. Thus, the proportion of patients who had been previously treated increased from 64.5% in 2019 to 77.2% in 2021 ($\chi^2 = 5.77$, p = 0.056).

Diagnostic groups

The increase in emergency consultations in 2021 could mainly be attributed to an increase of emotional disorders (F3, F4, F93) rising from 60.2% in 2019 to 67.7% in 2021 ($\chi^2 = 9.85$, p = 0.043).

Suicidal ideation

The proportion of patients who reported suicidal ideation increased from 68.5% in 2019 to 75.6% in 2020 to 84% in 2021 ($\chi^2 = 9.12$, p = 0.010).

Self-harm including suicide attempt

In 2019, 30.6% of patients reported self-harm in the context of the outpatient emergency consultation increasing to 36.5% in 2020 and 47.9% in 2021 ($\chi^2 = 8.65$, p = 0.013).

Discussion

The present study demonstrates that the COVID-19 pandemic is associated with a significant increase of emer-

Table 2:
Sociodemographic and clinical characteristics.

	March/April 2019	March/April 2020	March/April 2021	F / χ^2 statistics
Number of emergency consultations	109	86	164	
Previous treatment, (yes)[1]	69 (64.5%)	59 (76.6%)	115 (77.2%)	$\chi^2(2) = 5.77$, p = 0.056
Age (mean, SD)	14.89 (2.27)	14.81 (2.62)	14.41 (2.34)	F(2,356) = 1.55, p = 0.214
Gender (female), n (%)[2]	60 (56.6%)	49 (57.0%)	104 (64.2%)	$\chi^2(2) = 2.03$, p = 0.363
Emotional disorder (yes)[3]	59 (60.2%)	49 (63.6%)	105 (67.7%)	$\chi^2(4) = 9.85$, p = 0.043
Suicidal thoughts (yes)[4]	74 (68.5%)	62 (75.6%)	137 (84.0%)	$\chi^2(2) = 9.12$, p = 0.010
Self-harm (yes)[5]	33 (30.6%)	31 (36.5%)	78 (47.9%)	$\chi^2(2) = 8.65$, p = 0.013

SD: standard deviation

Excluded from the analyses:[1] unknown in 26 patients; [2] 5 indicated "other" as their gender (3 in 2019 and 2 in 2021); [3] 29 had no diagnosis assigned; [4] unknown in 6 patients; [5] unknown in 3 patients

Table 3:
Increase in % compared with previous period. % Change: difference from the period of the previous year divided by period of the previous year.

	Jul–Dec 2019	Jan–Jun 2020	Jul–Dec 2020	Jan–Jun 2021
Outpatient emergency telephone contacts	4.5%	31.5%	36.1%	50.7%
Outpatient emergency examinations	15.0%	0.6%	19.4%	39.3%
Outpatient emergency bridging interventions	47.3%	49.4%	36.7%	53.4%

gency contacts in child and adolescent psychiatry (telephone contacts, outpatient emergency assessments, emergency bridging interventions, emergency admissions to child and adolescent psychiatric acute care inpatient units as well as emergency admissions of minors to adult psychiatric inpatient units due to a shortage of beds in the child and adolescent psychiatric services).

Our study further supports the notion that the COVID-19 pandemic itself and the associated protective measures led to a significant increase in emotional disturbances, self-harm and suicidal behaviour among children and adolescents, in particular following the relaxation of restrictive measures after the first wave. Whereas among adults, various longitudinal and cross-sectional studies suggest that the mental health problems were relatively well managed, no such trend seems to emerge amongst adolescents.

Our study also gives some support to the notion that those minors who were already affected prior to the pandemic displayed the greatest difficulties with re-entry into normality [20]. On the other hand, "normality" can hardly be spoken of during this unprecedented COVID-19 era. For children and adolescents, the impact of the pandemic and the measures taken to manage it is relatively prolonged and more drastic than for adults, including in terms of crucial developmental trajectories. Overall, it is clear that children from disadvantaged families are more affected by the consequences of and restrictions posed by the pandemic, in particular in families with closer proximity to disease, higher economic stress and greater burden of housework and childcare [9].

In the management of the ongoing situation of such a pandemic, it will be important to identify not only somatic, but also psychiatric risk groups, whereby children and adolescents should not be forgotten as a particularly vulnerable group. In the case of renewed protective and restrictive measures, preventive and complementary measures that support children and adolescents with pre-existing psychological conditions in particular should be considered. Findings from our own representative study have shown that active coping strategies including physical activity, spending time in nature, competent use of media, purposeful activities such as reading or baking, as well as volunteering (e.g., with home delivery services) are more beneficial than avoidant behaviours. However, the survey also showed that children and adolescents had few opportunities to develop or exercise such coping strategies. Therefore, psychologically vulnerable young people especially should receive support to undertake such activities. During the COVID-19 pandemic, there were a large number of unemployed professionals from the cultural sector who could have been engaged in activities to assist this vulnerable at risk group in this regard. Measures restricting sports activities should also be considered very carefully in future crises.

It is important to highlight that, even before the COVID-19 pandemic, an increase in child and adolescent referrals to mental health services in Switzerland as well as worldwide has been reported for about a decade [22]. Also, a shortage of child and adolescent inpatient beds in the state of Zurich was already present prior to the COVID-19 pandemic. The emergency units had shown a steady increase in referrals of adolescents with suicidal ideation for over a decade. However, our study suggests that the pre-existing resource shortage within the child and adolescent psychiatric care system was heavily exacerbated during the COVID-19 pandemic. A shortage of psychiatric healthcare facilities, especially for children and adolescents, was stated in numerous reports of the Federal Health Department *(Bundesamt für Gesundheit BAG)* [23, 24]. This pandemic illustrates that investment in adolescent mental health care is urgently needed in order to strengthen it.

The underlying cause for the increase in psychopathology and service use among adolescents over the last decade, which was further exacerbated during the COVID-19 pandemic, is not fully understood. One of the major lifestyle changes that occurred in the last decade was the availability of smart phone devices and more sophisticated gaming platforms for children and adolescents. The average media time has increased by more than a third during the pandemic and not returned to pre-lockdown levels, which could be one possible contributing factor [10, 11]. Preventive and therapeutic strategies for our children and youth at risk of problematic internet use and those who have developed a gaming or media dependency, in particular during extraordinary times such as a pandemic, seem warranted. We believe that such strategies should be interdisciplinary, involving a range of key stakeholders, such as healthcare professionals (e.g., child and adolescent psychiatry, organisations specialised in problematic use of the internet), experts from the educational sector (school counsellors and school psychologists), consumers, parents, representatives from social media platforms (e.g., YouTube, Instagram, Snapchat, Tiktok), and representatives from major gaming platforms used in Switzerland by children and youth (e.g., Minecraft, Fortnite, Fifa and others).

The increase in self-harm and suicidal ideation was already observed in population-based studies [25], but our study in a cohort of help-seeking youth suggests that the pandemic appears to have exacerbated these phenomena. Therefore, we believe that mental health resources and interventions for help-seeking adolescents and young adults should be specifically tailored to deal with these specific problems, and should be evaluated nationwide [26]. Online interventions could also be considered here, which could be both appealing and accessible to this age-group, as well as offer a rapid response option to children and adolescents in crisis.

Further factors contributing to the increase in mental health service use could be that the interest of the general population in mental health problems, the frequency in which the topic is addressed in the newspapers, the attention payed by school staff to this kind of question have increased substantially. The emergence of social media platforms using algorithms reinforcing adolescent partially dysfunctional coping strategies, in particular relevant for eating disorders, depression, anxiety, self-harm behaviour and suicidality may further have contributed to a de-stigmatisation and to some extent even "trivialisation" of the term "mental health problems". At the same time teachers, parents and other adults in charge of young people may have experienced many different challenges themselves and often felt anxious, overwhelmed and loss of control. Taken together these factors may well have played an important

role in the increase of emergency mental health contacts of minors.

Our study has several limitations. First, we investigated the influence of the COVID-19 pandemic in a help-seeking cohort of children and adolescents presenting to a centralised psychiatric emergency service. Therefore, the increase in suicidality and self-harm cannot be generalised to the entire population and may even be only the tip of the iceberg. Secondly, due to the nature of the pandemic, we were not able to perform a systematic instrument-based psychopathology assessment in a prospective manner. Nevertheless, the retrospective cohort design has also some advantages as there is no selection bias, which might be particular important for investigating suicidality and self-harm. Another limitation might be that the assessment of suicidality and self-harm is purely based on the assessment of written reports in the clinical information system of the centralised psychiatric emergency service. However, it is noteworthy that psychopathology assessment and reporting is systematically trained and one of the key tasks of our psychologist, registrars and consultants in the centralised psychiatric emergency service [27, 28]. Furthermore, in the case of suicidality, in our centralised emergency service, it is the rule that a patient is assessed by two independent trained clinicians.

Despite the increase in psychopathology and distress, it appears that only a fraction of young people actually seek help. Only 12% of college students in France who expressed concerns about mental health problems sought professional help [29]. This means that the provision of preventive and therapeutic measures to at-risk groups, which seem to be particularly affected in such a crisis, needs to be rethought. Low threshold early intervention services such as the head space initiative in Australia [30] are potential new ways forward. Lara B. Aknin, head of the COVID-19 Commission Mental Health Task Force *the Lancet* suggests in a position paper [2] that preventive interventions for adolescents based on the principles of mindfulness [31], gratitude [32], the practice of kindness or generosity [33, 34], self-compassion or the notion of the best possible self [35] could potentially help better control both positive and negative emotions. Such approaches could help strengthen the well-being of vulnerable groups after the pandemic. Unlike traditional mental health-care, such approaches would typically be brief, accessible, convenient, self-applicable and non-stigmatising, and could reach those young people who do not present to emergency mental healthcare centres. Future research is needed to further understand the underlying reasons for our troubled youth and investigate the effectiveness of age-specific preventive interventions and treatments.

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Appendix

Defining the terms of the variable list

Subject ID:	ZH (n+1)	
	0 ≤ n ≤ number of cases-1	
	E.g. ZH1, ZH2 ZH3 etc.	
Ethnicity: according to https://www.bfs.admin.ch/bfs/de/home/statistiken/bevoelkerung/migration-integration/auslaendische-bevoelkerung.html	Majority:	Swiss
	Minority:	German
		French
		Italian
		Portuguese
	Other:	Rest of Europe
		America
		Asia
		Africa
		Oceania
	Unknown:	Ethnicity is not known
Post code: The postcode of the residence of the Patient	Estimation of socioeconomic status according to average income per capita in each area (Gemeinde)	
	https://www.zh.ch/de/steuern-finanzen/gemeindefinanzen/zahlen-gemeindefinanzen/gemeindefinanzportrait-hrm2.html	
	https://www.zh.ch/de/steuern-finanzen/gemeindefinanzen/zahlen-gemeindefinanzen.html	
Looked after Child at the time of the presentation:	Yes:	Child is living at home with legal guardians
	No:	Child is living in a children's home
	Unknown:	It is not known how the child is being looked after
Education or employment status:	Mainstream:	Swiss school system (Primarschule/Sekundarschule/Gymnasium)
	Special:	Special schools (Kleinklassen, Tagessonderschulen für spezielle Bedürfnisse), boarding school, psychiatric day clinic (Tagesklinik)
	Not attending:	Not attending a school or an employment for min. 1 month (define time period)
	Apprenticeship:	Attending an apprenticeship (Lehre)
	Work:	Attending a job
	Unknown:	Education or employment status is not known
Date of arrival to A&E & Date of discharge from A&E:	Same Date (DD/MM/YY)	
Admitted to Acute Ward: Acute Ward = acute admissions unit	Yes:	Switzerland = Akutstation (admission overnight, but not an outpatient consultation in an emergency service)
	No:	Patient did not get admitted to the acute ward
Admitted to intensive therapy unit (ITU):	Yes:	Patient was admitted to intensive therapy unit (intensiv station)
	No:	Patient was not admitted to intensive therapy unit
Admitted to psychiatric inpatient ward:	Yes:	Patient was admitted to psychiatric inpatient ward (Stationär aufgenommen)
	No:	Patient was not admitted to psychiatric inpatient ward
Presence of suicidal thinking:	Yes:	Patient has suicidal thoughts
	No:	Patient does not have suicidal thoughts
Reason for the A & E Presentation	Self- harm:	Patient intentionally causes harm to their own body (e.g., cutting, burning, poisoning, punching themselves etc.)
	Other:	Many reasons, examples are: looking for help with their situation, especially in an acute crisis; friends or family saw it as necessary to come to the A & E as they can't manage the situation alone any more; they are a danger for others; can't control themselves any more; suicidal
	Unknown:	It is not known why the patient came to the A & E
Was the child/young person assessed/treated/detained involuntarily, under local mental health laws?	Informal:	Voluntarily; Patient agreed to the following process.
	Detained:	A hospitalization is done against the patients/the parents will through a doctor. Switzerland = fürsorgerische Unterbringung (FU)
	Unknown:	It is not known what processes were done with the Patient
Only for self-harm presentation: These following questions will be only answered if the patient presented a form of self-harm.		
Suicidal Intent in self- harm	Yes:	The self-harm was done with suicidal intentions
	No:	The self-harm was not done with suicidal intentions
Method of self- harm 1 and 2:	Self- poisoning:	Poisoning oneself with the intent of harming oneself.
	Self-injury with skin damage: injuring the skin intentionally to harm oneself	
	Firearm:	Using a firearm (gun/pistol/rifle) to deliberately induce self-harm
	Hanging:	Hanging oneself with a rope causing self-injury
	Drowning:	Drowning oneself causing self-harm
	Jumping from heights:	Deliberately jumping from various heights to injure oneself
	Other:	Other forms of self-harm were used
	Unknown:	Method of self-harm is not known
Social media used to communicate about SH/Was social media a factor in this presentation?	Yes:	Patient informed about their self-harm intentions online
		Patient learned about self-harm through social media
	No:	Patient did not use social media to communicate self-harm nor did social media influence them to harm themselves.
	Unknown:	The connection between social-media and self- harm is not known.

Used alcohol before, during or after SH?	Yes	Patient consumed alcohol in the time period around the SH
	No	Patient did not consume any alcohol in the time period of the SH
Used illicit drugs before/during/after SH?	Yes	Patient consumed illicit (illegal) drugs in the time period around the SH
	No	Patient did not consume any illicit drugs in the time period of the SH
Primary and secondary diagnosis: (in brackets I put ICD10 classification)	No diagnosis:	the patient does not have a diagnosis
Emotional disorder:	Depression (F32.-)	
	Manic episode (F30.-)	
	Bipolar disorder (F31.-)	
	Persistent mood (affective) disorders (F34.-)	
	Anxiety disorders (F40.- & F41.-)	
	Obsessive compulsive disorder (F42.-)	
Behavioural Disorder:	ADHD (F90.-)	
	Conduct disorder (F91.-)	
	Oppositional Defiant Disorder (F91.3)	
Psychotic disorder = Psychosis: detachment from reality through delusions and or hallucinations	Schizophrenia (F20.-)	
	Brief Psychotic disorder (F23)	
	Delusional Disorder (F22)	
Eating disorder: (F50.-)	Bulimia nervosa (F50.2)	
	Anorexia nervosa (F50.0)	
	Binge eating disorder (F50.81)	
	Pica (F98.3)	
	Other eating disorders (F50.8)	
Neurodevelopmental Disorder	Criteria for psycho-organic Syndrome (POS) confirmed (a Swiss health insurance diagnosis differentiating simple ADHD from ADHD with persisting cognitive deficits	
	Autism (F84.0)	
	Speech and language disorders	
	Tourette syndrome (F95.2)	
	Tic disorders (F95.5)	
	F80-F89 Disorders of psychological development: Disorders of speech and language (F80.-) / learning disability (F81.-)	
Substance Misuse Disorder (F1x.xxx)	Addiction to substances (illegal/legal)	
	Inability to control the consummation of these substances and change in behaviour due to the addiction.	
Somatoform Disorder (F45.-)	Physical symptoms caused by mental illness.	
Personality Disorder (F60.-)	Antisocial personality disorder (F60.2)	
	Avoidant personality disorder (F60.6)	
	Borderline personality disorder (F60.3)	
	Dependent personality disorder (F60.7)	
	Histrionic personality disorder (F60.4)	
	Narcissistic personality disorder (F60.81)	
	Obsessive compulsive personality disorder (F60.5)	
	Paranoid personality disorder (F60.0)	
	Schizoid personality disorder (F60.1)	
Other	The patient shows a different diagnosis than listed above.	
Unknown	The diagnosis of the patient is unknown	
Previous contact with mental health (MH) services:	Yes:	Patient has had contact with MH services in the past (therapy, A&E, acute ward, day clinic etc.)
	No:	Patient has not had contact with MH services in the past