



MSc in Clinical Psychology
Department of Psychology

**Profile Analysis of Young Adults Seeking
Addiction Treatment**

October, 2021

Student: Selma Ósk Höskuldsdóttir

ID number: 110486 – 2869

Supervisor: Ingunn Hansdóttir

Foreword and acknowledgment

The following study was done in collaboration with SÁÁ (National Center for Addiction in Iceland) as a part of a quality project to strengthen and further improve their treatment care for young adults. It is important to understand the size of the problem and the nature of this diagnostic group to better meet their needs and improve future outcomes of specialized addiction treatment. The aim of this study was thus to gain a better understanding of the characteristics of young adults seeking addiction treatment in Iceland.

This study is presented as an article intended for submission to a peer-reviewed journal with my supervisor Ingunn Hansdóttir as co-author. It is a partial requirement towards an MSc degree in Clinical Psychology at Reykjavík University and is a final result of research work that spanned over three semesters and three months. The first semester a literature review was conducted on the selected research topic, and an application for research approval was sent to the National Bioethics Committee. The groundwork and suitable methods were explored in the second semester, and a first draft of the method chapter and probable results were made. The final semester was intended for data analysis and the final writing of this paper; however, data were not available for analysis until mid-summer due to external factors. Therefore, data analysis and the final writing of this paper took place in the second half of the summer and this autumn.

Special thanks go to dr. Ingunn Hansdóttir, my supervisor and chief psychologist of SÁÁ, for all her support, guidance, and advice in writing this thesis. I also want to thank dr. Linda Bára Lýðsdóttir for her assistance in final editing of this thesis, Julia Aspelund for retrieving the data, and SÁÁ for providing me with excellent facilities during the data analysis and final paper writing. At last, my deepest gratitude goes to my family—Sigurður Amlín Magnússon and Embla Hrönn Amlín Sigurðardóttir for their unconditional support, understanding, and patience through my studies. Thank you.

Abstract

The aim of this study was to gain a better understanding of the characteristics of young adults seeking addiction treatment in Iceland. Data were drawn from medical records of all consecutive hospital admissions of 148 patients entering specialized treatment for young adults, age 18-26, over six months. Findings showed that young people who seek addiction treatment at Vogur Hospital bring with them a range of complex needs, mainly social, substance use, and mental health issues. Most participants had only completed compulsory education and only a third were employed. Furthermore, young adults with the most re-admissions had a more serious demographic profile than those with fewer admissions. These young adults have a severe addiction, and the majority were diagnosed with poly-substance use, with cannabis dependence being the most common primary diagnosis. Many reported having overdosed, and a history of psychiatric problems was common. Almost two-thirds reported a confirmed psychiatric diagnosis, and over one-third had a history of receiving child and adult psychiatric services. The majority of young adults reported self-harm behavior, and almost half reported suicide attempts. This study provides a unique socio-demographic profile, substance use and treatment pattern, and psycho-social profile of young adults who seek addiction treatment at Vogur Hospital. Study results implicate the need for more holistic- and individualized treatment and support following treatment completion to better meet the needs of many treatment-seeking young adults.

Keywords: addiction treatment, young adults, profile, mental health

The years of young adulthood, age 18-26, are characterized by a transformation from adolescence to adulthood and significant psychological development (Committee on Improving the Health, Safety and Well-Being of Young Adults et al., 2015b). However, policymakers and healthcare providers tend to treat young adults as fully developed adults and fail to realize that cognitive and psychological development is incomplete. Young adults may continue to need previous assistance from child services, and health care services may need to be adapted to the developmental level of young adults (Committee on Improving the Health, Safety and Well-Being of Young Adults et al., 2015b).

The years of young adulthood are also a time of critical importance in laying the foundations for future well-being, e.g., preparing for a career, economic security, and social relationships (Committee on Improving the Health, Safety and Well-Being of Young Adults et al., 2015a). Substance use is one of the activities that adolescents and young adults are more likely to start to engage in this life course and can greatly affect their future well-being (Committee on Improving the Health, Safety and Well-Being of Young Adults et al., 2015b; National Institute on Drug Abuse, 2020).

In fact, studies have shown a turn for the worse in substance use patterns of young adults. For example, marijuana use in the US is at a historic high in college-age adults, probably resulting from a change in perception of risk of use and an all-time low in binge drinking (National Institute on Drug Abuse, 2019).

In Iceland, there has been a decrease in treatment-seeking among adolescents at SAA (National Center for Addiction in Iceland). However, substance use patterns of those presenting for treatment are more severe, e.g., increased opioid, stimulant, and poly-substance use and more young people who inject strong opioids (P. Tyrfinngsson, 2019b). These rises cause concern since

the fatality rate is high among people who inject drugs. Additionally, mental and physical problems are more common among people with stimulant addiction, and their prognosis is worse than for alcohol- and cannabis addiction (P. Tyrfingsson, 2019b).

The risk of substance overdose and mortality are thus prominent among young substance users. Studies have shown that one of the primary causes of premature death among young people with substance use disorder (SUD) is overdose, and about 30% of young in- and outpatients have a history of overdose (Yule et al., 2018). Almost half of all individuals who died prematurely among Icelanders age 20-24 years in 2016-2017 had a history of addiction treatment at SAA (P. Tyrfingsson, 2019a). Furthermore, specific characteristics have been associated with overdose, including a history of psychiatric hospitalization, suicide attempt, self-harm, and having entered inpatient treatment. Moreover, patients with more than one SUD have been found three times more likely to have a history of overdose (Yule et al., 2018). With the risk of overdose in mind, the previously mentioned rise of poly-substance use raises even more concern since it is associated with more SUD diagnoses.

A complex combination of factors affects the risk for substance use and addiction (Hawkins et al., 1992; National Institute on Drug Abuse, 2018; Stone et al., 2012). The more risk factors one has, the more likely it is that substance use may lead to addiction (National Institute on Drug Abuse, 2018). Among those factors are heritability and gender. SUD is among the most heritable mental disorders and has been shown repeatedly to run in families, with a risk ratio ranging from 2.27 for alcohol and up to 7.3 for amphetamine among first-degree relatives (T. Tyrfingsson et al., 2010). Gender has been considered a risk factor for addiction, with men being more likely to use substances and develop a substance problem than women in young adulthood (Cotto et al., 2010; Stone et al., 2012). However, women seem to develop dependence faster

from first initiation of the substance, and when they enter treatment, they tend to have more social-, behavioral, and psychological problems than men (Greenfield et al., 2010; McCrady et al., 2020).

Many known risk and protective factors in childhood and adolescence can predict adolescent and young adulthood substance use and substance use problems (Stone et al., 2012). The influence of family and friends has been found a significant factor. Peer influence has been shown to have a substantial impact on adolescents' decision to use substances, and adolescents who associate with substance-using peers are much more likely to start using substances (Hawkins et al., 1992; Stone et al., 2012). However, adolescents with greater parental monitoring and more attachment to their parents are less likely to have friends who use substances (Bahr et al., 2005). Interestingly, when controlling for peer influence, family influence directly affects adolescents' substance use, but adolescents who have parents who are tolerant of drug use are more likely to have substance-using friends (Bahr et al., 2005). Other important family-related factors known to increase adolescent risk of substance use are parental and sibling substance use and parental drug attitudes (Bahr et al., 2005; Epstein et al., 2020; Hawkins et al., 1992; Stone et al., 2012; Wu et al., 2020).

The age of onset has been found an important factor in the development of SUD, where SUD is more common among those who start using substances in adolescence than those who start using substances in adulthood (Anthony & Petronis, 1995; Stone et al., 2012). Specific types of adverse childhood events (ACEs) are associated with substance initiation before age 14: parental divorce, physical- or sexual abuse, having a household member with a mental health problem, and substance misuse in the home (Rothman et al., 2008). A strong relationship has been found between the number of ACEs and the prevalence and development of various health

problems, including substance problems (Dube et al., 2003; Zarse et al., 2019). Thus, factors related to family and early childhood experiences can impact the development of substance use problems later in life.

In light of the developmental status of adolescents and young adults, it is not surprising that addiction treatment efficacy is modest, with studies indicating that only 32-35% of adolescents entering treatment being abstinent the following year (Anderson et al., 2007; Williams & Chang, 2000).

A greater number of treatment-seeking has been associated with more severe addiction characteristics, criminal activity, and intravenous drug use among people in addiction treatment (Anglin et al., 1997). To reduce the number of treatment-seeking it is important to know what affects a successful treatment outcome.

Evidence suggests that personal and environmental factors affect treatment outcomes among substance-using adolescents (Anderson et al., 2007; Williams & Chang, 2000). Williams and Chang (2000) reviewed factors predicting treatment effectiveness for adolescents before-, in-, and post-treatment. A strong positive predictor of outcomes was the support of non-using peers and parents before and after treatment. In addition, were lower rates of substance use, better school attendance, and functioning common pre-treatment factors for a successful outcome. However, the most consistent variable related to a successful outcome as an in-treatment factor was the completion of treatment. Other in-treatment variables that predicted a better outcome were therapist experience, more extensive programs with larger budgets, and program comprehensiveness. Post-treatment variables related to positive outcomes were attendance in aftercare, having non-using peers or parents, and better relapse coping skills (Williams & Chang, 2000).

Mental health is also an important determinant of addiction treatment efficacy given that SUD and psychiatric disorders are highly comorbid (Anderson et al., 2007; Kelly & Daley, 2013; Tomlinson et al., 2004). Adolescents with a co-occurring psychiatric disorder and SUD have been shown to have a higher rate and more rapid return to substance involvement following treatment than their peers who only have SUD (Tomlinson et al., 2004). Young adults with co-occurring posttraumatic stress disorder (PTSD) and SUD seem to be particularly vulnerable to relapse post-treatment (Staiger et al., 2009). In Hannesdóttir et al.'s (2001) study, were co-occurring mental disorders found among three-quarters of adolescents attending addiction treatment at Vogur Hospital (SAA National Center for Addiction in Iceland). The most common mental disorders being conduct disorder (44%), depression (28%), PTSD (11%), and anxiety disorder (6%). Vogur's PTSD results are intriguing since the rate is lower than in other findings. For example, did Deykin and Buka (1997) find 19% prevalence rates of PTSD among their substance-dependent adolescents with higher prevalence rates for females (40%) than males (12%).

It is evident that multiple factors can affect treatment outcomes, and accordingly, the National Institute on Drug Abuse emphasizes that treatment should be individualized, addressing adolescents' more extensive needs in conjunction with their substance problems (National Institute on Drug Abuse, 2020).

Substance use pattern is changing for the worse, with the potential to cause more harm and putting young adults at heightened risk for premature death. Research evidence shows a relationship among biological-, environmental-, psycho-social factors and substance use in young adults (Khan et al., 2020; Stone et al., 2012). According to the Substance Abuse and Mental Health Services Administration (2020), the prevalence rate of substance use disorder is

highest among young adults. However, little is known about substance-using young adults in Iceland, and no studies have been conducted especially on addiction treatment-seeking young adults in Iceland. Given the importance of young adulthood in the life course, it is necessary to examine it explicitly rather than looking at it as an extension of adolescence or as an equivalent period of adulthood (Committee on Improving the Health, Safety and Well-Being of Young Adults et al., 2015b). Population-based surveys on substance use of school-aged adolescents have been conducted regularly in Iceland (Guðmundsdóttir et al., 2019). Unfortunately, most of these surveys are limited to those who attend school and do not capture adolescents and young adults that drop out of school (Wu et al., 2020). Especially since adolescents and young adults who drop out of school are more likely to develop SUD and present to treatment (Pálsdóttir et al., 2010; Townsend et al., 2007).

The first aim of the present study was to investigate the socio-demographic- and psychosocial status and pattern of substance use and treatment among a cohort of patients attending specialized addiction treatment for young adults in Iceland. The second aim was to explore whether there are differences in the profile presented in young adults by gender, the number of treatment admissions, and history of intravenous drug use.

Method

Procedure and participants

This study is a retrospective cohort study of young adults attending addiction treatment. Participants in this analysis were drawn from young adults' medical records that entered treatment at Vogur hospital over six months in 2021. The study sample consisted of 191 admissions of 148 young adults (29% female), with a mean age of 21.8 years ($SD = 2.36$). Of all

the young adults who sought treatment, 23.6 % ($n = 35$) entered treatment more than once over the period.

Medical data from the patient's first admission of the calendar year were analyzed. In a few instances, data from subsequent admissions were analyzed in order to have a more complete profile of the participants on key variables if data entry was incomplete in the first treatment of the calendar year. However, data on DASS21 results were not transferred between admissions since the results were likely to vary between entries.

In accordance with Anglin et al.'s (1997) result showing that the mean number of treatment-seeking is 3.5, participants entering their first to fourth treatment were assigned to a LowTA group. Participants entering their fifth treatment or more were assigned to a HighTA group.

Data used were clinical observations, medical diagnosis, and psychological tests results gathered in standard hospital care of young adults, obtained and recorded in patients' medical files by the medical and treatment team of the hospital. All diagnoses, interviews, and questionnaire submissions are made during the admission period, which is ten days on average. Upon admission, they receive a confirmed diagnosis from a physician. However, standard treatment interviews are carried out soon after arrival depending on the patients' condition, but psychological instruments are submitted sometime during the admission.

The data were retrieved from medical records at SAA after the National Bioethics Committee granted permission (VSN-21-104) and in accordance with the Data Protection Authority. Information on the study variables was made available without any personal identifiers (only a research code identified each case; this code was preserved by SAA public health expert and data manager) and collected into a research data file stored in an access-

controlled system within the SAA computer system to ensure the security of the data. The data was made available for analysis for the purpose of this study within this system only.

Due to the nature of the clinical data, not all participants had complete information on all study variables, leading to considerable missing. Possible reasons for missing data are; that some healthcare providers collect the data but do not record it in medical files or hand it over to the medical secretaries. That patient leaves the hospital before all interviews and lists have been submitted. Self-report lists were incompletely filled. Some counselors may forget to submit a questionnaire due to workload, skip over questions and lists, or do not know about recently changed processes due to lack of information provision.

Materials

Data relating to the profile analysis were extracted from hospital medical records. The following information was obtained; socio-demographic and clinical details at the time of treatment entry, including gender, age, residence, marital status, children, living arrangement, education, employment status, probation status, severity of SUD according to DSM5, number of treatment admissions (NOFTA) and treatment completion, age of onset and problematic substance use, primary substance diagnoses, poly-substance use, and history of intravenous drug use (HIDU), history of injecting drugs at some time in life (HID), no history of injecting drugs (NID), frequency of intravenous drug use, and history of drug overdose. In addition, psycho-social variables relating to family (parental support when in trouble, addiction among first-degree relatives), friends (friends in recovery, no. of friends with addiction problem), and mental health history (child and adolescent psychiatric services, adult psychiatric hospital admission, confirmed psychiatric diagnosis), serious mental health problems (self-harm, attempted suicide). Information on history of trauma (ACEs questionnaire and the PC-PTSD-5 screen) and well-

being (assessed by DASS-21) were provided by the following structured assessment tools (see Appendix for further clarification of study variables).

The Depression, Anxiety, and Stress Scale 21 (*DASS21*; Lovibond & Lovibond, 1995) is a self-assessment measure consisting of three subscales with seven items, each assessing depression, anxiety, and stress symptoms. A total score is computed for each subscale, where a higher score indicates greater severity. People answer how each item applied to them over the past week on a four-point scale (Antony et al., 1998).

Studies show that the Icelandic version of DASS-21 has comparable psychometric properties to international versions. Cronbach's alpha has been found to range between .85-.92 for the three subscales of the Icelandic version (Ingimarsson, 2010).

The Adverse Childhood Event questionnaire (*ACE*; Felitti et al., 1998) is a brief self-report measure that comprises ten dichotomous questions that identify childhood abuse (emotional, physical, and sexual), neglect (emotional and physical), and exposure to household dysfunction (concerning parental separation, substance abuse-, mental illness-, domestic violence- and criminal behavior of a household member) before age 18 (Felitti et al., 1998). A total score is calculated by summing up the number of questions answered with yes. A higher score indicates greater adverse experiences before age 18 and can indicate a higher risk for later health problems (Felitti et al., 1998). The scale has been found to have good test-retest reliability and adequate internal consistency, Cronbach's alpha = .88 (Dube et al., 2004; Murphy et al., 2014).

Since people who have experienced five ACE's or more have been found to be seven to ten times more likely to be addicted to substances and use substances intravenously, compared to people with no ACE's (Dube et al., 2003), participants were split into 0-4 points and 5-10 points

groups when exploring association to gender, the number of treatment admissions, and history of intravenous drug use.

The Primary Care PTSD Screen for DSM5 (*PC-PTSD-5*; Prins et al., 2003) is a five-item screening instrument used to identify probable PTSD (Prins et al., 2016). The screen assesses whether there is any history of lifetime exposure to a traumatic event. The assessment is continued if there is a history of exposure and participants indicate whether the event has caused symptoms particular to PTSD over the past month (e.g., numbing, re-experience, numbing, hyperarousal, negative cognition), producing a summary score of symptoms experienced, ranging in zero to five points (Prins et al., 2015). If the total score consists of three points or more, further assessment of PTSD is recommended. PC-PTSD-5 has excellent diagnostic accuracy and has been found reliable with a coefficient of 0.83, indicating good test-retest reliability (Prins et al., 2016; Prins et al., 2003). However, the psychometric properties of the screen have not been carefully reviewed and have mainly been tested by older male war veterans that might limit the generalizability of former findings (Prins et al., 2016). Psychometric properties of the PC-PTSD-5 and ACE have not been tested in the Icelandic population.

Statistical analysis

IBM SPSS Statistics for Windows (version 27.0) was used to perform statistical analysis (IBM Corp., 2020). Descriptive statistics were used to describe the sample and provide a socio-demographic and psycho-social profile, and pattern of substance use and treatment. Crosstabs were used to examine differences in socio-demographic and psycho-social profile, pattern of substance use and treatment regarding gender, number of treatment admissions, and history of intravenous drug use. Seeing that variables were categorical, Pearson Chi-square tests were used to conclude the significance of associations. If expected count was less than 5 in more than 20%

of the cells, categories were merged to increase the number in each cell. Minimum merging of categories was attempted. In some instances (e.g., primary substance diagnosis), it was not logical to merge categories, and therefore, premises for doing the Chi-square test were not met (and are therefore not reported). A Fisher's Exact Test was used instead of a Chi-Square test if cells had expected count less than 5 in more than 20% of the cells in 2x2 tables. The critical value for significance was set at $p < .05$ for all analyses.

Results

Socio-demographic profile

Socio-demographic characteristics of young adults in addiction treatment are shown in Table 1; note that because of missing data, the total number of individuals (n total) varies between study variables as depicted in all tables.

Patients ranged in age from 18 to 26 years and most lived in the capital area (77.6%) with their parents (47.1%) or on their own (29.8% rent or 5.1% own property); however, 16% were homeless or had unstable housing.

Most young adults seeking treatment were single (74.1%), had no children (85.2%), and had only completed elementary school or less (72.6%). About half were unemployed, just over a quarter had a steady job (28.8%), 5.1% were students, and 14.8% were on probation when they entered treatment.

No significant gender differences were found for socio-demographic characteristics of young adults except in marital status, with more women reporting being in a relationship (50% vs. 16.9% men; $\chi^2(1) = 10.01, p = .002$).

However, significant differences were found between the high and low treatment groups when the number of treatment admissions was explored. Almost half of the HighTA young

Table 1

Socio-Demographic Characteristics of Young Adults Seeking Addiction Treatment

				Number of treatment admissions at Vogur Hospital				History of intravenous drug use									
	<i>n</i>	%	<i>N</i> total	LowTA ≤ 4		HighTA ≥ 5		<i>n</i>	%	<i>n</i> total	<i>p</i>	Never injected drugs (NID)		Have injected drugs (HID)		<i>n</i> total	<i>p</i>
				<i>n</i>	%	<i>n</i>	%			<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Gender																	
Men	105	70.9	148	41	70.7	17	77.3	80	.556*	73	75.3	25	65.8	135	.267*		
Women	43	29.1		17	29.3	5	22.7			24	24.7	13	34.2				
Age																	
18 years old	15	10.1	148	7	12.1	2	9.1	80	***	9	9.3	3	7.9	135	.929*		
19-20 years old	31	20.9		13	22.4	4	18.2			20	20.6	9	23.7				
21-22 years old	37	25.0		17	29.3	6	27.3			24	24.7	10	26.3				
23-24 years old	43	29.1		15	25.9	8	36.4			28	28.9	12	31.6				
25-26 years old	22	14.9		6	10.3	2	9.1			16	16.5	4	10.5				
Residence																	
Live in the capital area	114	77.6	147	40	70.2	20	90.9	79	.053*	72	75.0	33	86.8	134	.134*		
Live outside of the capital area	33	22.4		17	29.8	2	9.1			24	25.0	5	13.2				
Marital status																	
Single	66	74.1	89	41	70.7	17	77.3	80	.556*	47	75.8	15	71.4	83	.690*		
In a relationship	23	25.8		17	29.3	5	22.7			15	24.2	6	28.6				
Have children	17	14.8	115	10	17.5	2	9.1	79	.348*	10	13.0	6	20.0	107	.376**		
Living arrangement																	
Unstable housing or Homeless or Halfway house	19	18.2	104	4	8.5	8	47.1	64	.001*	9	11.5	10	38.5	104	.008*		
Renting or own property	36	34.6		20	42.6	2	11.8			30	38.5	6	23.1				
Live with parents	49	47.1		23	48.9	7	41.2			39	50.0	10	38.5				
Highest education level completed																	
Elementary school or less	85	72.6	117	36	65.5	19	95.0	75	.011*	57	67.9	25	86.2	113	.056*		
More than two years in upper secondary school or higher	32	27.4		19	34.5	1	5.0			27	32.1	4	13.8				
Employment status																	
Unemployed or Unsure about employment	60	50.9	117	30	54.5	14	70.0	75	.399*	39	47.0	17	58.6	112	.165*		
Steady employment or Student	39	33.9		20	36.4	4	20.0			33	39.8	6	20.7				
Disability benefits or Rehabilitation program	18	15.2		5	9.1	2	10.0			11	13.3	6	20.7				
On probation	13	14.8	88	3	5.2	9	42.9	79	<.001**	3	4.9	8	38.1	82	<.001**		

Notes: *n* total= total number of participants that had records of specified variable, *Pearson Chi-Square test, ** Fishers exact test, ***Premises for Pearson Chi-Square test were not met.

adults lived with unstable housing, in a halfway-house, or were homeless (47.1% vs. 8.5% LowTA; $\chi^2(2) = 13.5, p = .001$). Only 5% of HighTA had completed at least two years of upper secondary school education (vs. 34.5% LowTA; $\chi^2(1) = 6.55, p = .011$), and almost half were on probation (42.9% vs. 5.2% LowTA; $p < .001$).

Similar results were seen for participants with a history of intravenous drug use (HID), were living with unstable housing, in a halfway-house, or being homeless was more common among HID (38.5% vs. 11.5% NID; $\chi^2(2) = 9.621, p = .008$), and more were on probation (HID 38.1% vs. 4.9% NID; $p < .001$).

Pattern of substance use and treatment

Substance use and treatment patterns of young adults are displayed in table 2. Almost all young adults, or 99%, were diagnosed with severe substance use disorder. Moreover, 78.1% met all 11 criteria of substance use disorder (SUD).

Cannabis and alcohol dependence were the most common primary substance diagnosis (53.7%). However, three-quarters of young adults received more than one SUD diagnosis. Young adults who had or were presently injecting drugs regularly were almost one-fifth of the sample, and one-tenth had a history of injecting drugs several times in their lifetime, making these two groups almost 30% of the sample. History of overdosing was common, where over 40% of young adults reported overdosing at some time in their life.

The participants' mean age of onset of substance use was 14.16 years ($SD = 1.8$), initiation ranging from 10-17 years of age. Furthermore, substance use became problematic for almost half of the young adults before age 17 (45.7%). The mean age for problematic use was 17 ($SD = 2.3$), ranging from 13-23. The mean number of treatment admissions was 2.5 ($SD = 3.5$, Median = 1).

Table 2

Pattern of Substance Use and Treatment of Young Adults Seeking Addiction Treatment

				Number of treatment admissions at Vogur Hospital					History of intravenous drug use						
	<i>n</i>	%	<i>N</i> total	LowTA ≤ 4		HighTA ≥ 5		<i>n</i> total	<i>p</i>	Never injected drugs (NID)		Have injected drugs (HID)		<i>n</i> total	<i>p</i>
				<i>n</i>	%	<i>n</i>	%			<i>n</i>	%	<i>n</i>	%		
Primary substance diagnosis															
Alcohol dependence	31	23.1	134	17	31.5	1	4.8	75	***	29	29.9	2	5.4	134	***
Cannabis dependence	41	30.6		23	42.6	4	19.0			35	36.1	6	16.2		
Amphetamine dependence	19	14.2		6	11.1	5	23.8			7	7.2	12	32.4		
Cocaine dependence	18	13.4		3	5.6	2	9.5			13	13.4	5	13.5		
Opioids dependence	19	14.2		3	5.6	8	38.1			8	8.2	11	29.7		
Sedative, hypnotic or anxiolytic dependence.	4	3.0		1	1.9	1	4.8			3	3.1	1	2.7		
Other - in remission	2	1.5		1	1.9	0	0.0			2	2.1	0	0.0		
Diagnosed with two or more substance use disorders	101	75.4	134	38	70.4	20	95.0	75	.029**	70	72.2	31	83.8	134	.163
Frequency of intravenous drug use															
Never injected drugs	97	71.9	135	49	90.7	7	33.3	75	***						
Injected drugs regularly at some time in their life	25	18.5		3	5.6	9	42.9								
Injected drugs several times at some time in their life	13	9.6		2	3.7	5	23.8								
Have overdosed	38	43.2	88	19	33.3	16	72.7	79	.002*	22	36.1	13	61.9	82	.039*
Age of onset of substance use															
10-14 years old	20	54	37	12	48.0	4	66.7	31	.654**	12	48.0	5	83.3	31	.185*
15-17 years old	17	45.9		13	52.0	2	33.3			13	52.0	1	16.7		
Age when substance use became problematic															
13-16 years old	16	45.7	35	12	44.4	2	66.7	30	.586**	10	43.5	3	42.9	30	.357**
17-23 years old	19	54.3		15	55.6	1	33.3			13	56.5	4	57.1		
Number of times admitted at Vogur hospital															
First time seeking treatment	34	42.5	80							31	55.4	0	0.0	75	<.001*
Second to fourth treatment admission	24	30.1								18	32.1	5	26.3		
Fifth to thirteenth treatment admission	22	27.5								7	12.5	14	73.7		
Completed last treatment at Vogur	35	68.6	51	18	78.3	12	54.5	45	.092**	21	75.0	13	61.9	49	.325*

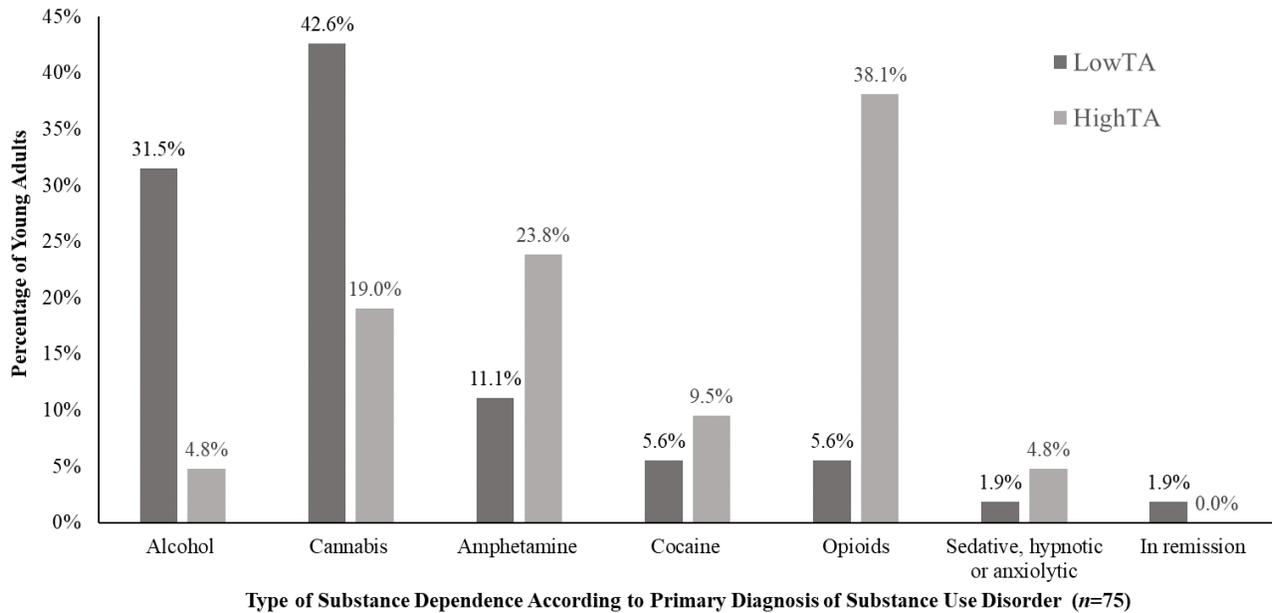
Notes: *n* total= total number of participants that had records of specified variable, *Pearson Chi-Square test, ** Fishers exact test, ***Premises for Pearson Chi-Square test were not met.

The proportion of young adults entering treatment for the first time was 42.5% of the sample, and almost three-quarters had four or fewer admissions. For those who had a previous admission (57.5%), the mean number of admissions was 4.4 ($SD = 3.6$, Median = 3). The treatment completion rate for the sample was 83.3%. Among participants with a previous admission, the treatment completion rate for the last admission was 68.6%.

No significant gender differences were found for pattern of substance use and treatment. However, differences in primary diagnosis were apparent between the HighTA and LowTA groups, where primary diagnoses in harder drugs were more common among HighTA participants. Figure 1 shows primary diagnosis among participants by the number of treatment admissions.

Figure 1

The Proportion of Young Adults Primary Diagnosis by Number of Treatment Admissions



Note. The X-axis shows the type of substance dependence according to their primary SUD diagnoses. LowTA= Young adults attending their first to fourth treatment admission, HighTA= Young adults attending their fifth treatment admission or more.

Similar differences were found among HID and NID participants, as depicted in table 2.

Further differences in pattern of substance use and treatment were apparent between the HighTA and LowTA groups. More HighTA participants had: overdosed (HighTA 72.7% vs. 33.3% LowTA; $\chi^2(1) = 9.98, p = .002$), more than one SUD diagnoses (HighTA 95.0% vs. 70.4% LowTA; $p = .029$) and injected drugs at some time in their life (66.7% vs. 9.3% LowTA). However, fewer HighTA participants completed their last treatment at Vogur (54.4% vs. 78.3% LowTA; NS).

When looking at HIDU, several differences in substance use and treatment patterns emerged between HID and NID participants. Where more HID participants had: initiated substance use between 10-14 years old (83.3% vs. 48.0% NID; NS), overdosed (61.9% vs. 36.1% NID; $\chi^2(1) = 4.26, p = .039$), and attended treatment significantly more often than NID participants. With 87.5% of NID participants entering treatment four times or less, but almost three-quarters of HID participants entering five or more treatments ($\chi^2(2) = 29.69, p < .001$).

Psycho-social profile

Psycho-social characteristics of young adults are presented in table 3. Being able to seek, always or often, support from their mother when in trouble was reported by most participants (67.0%). Similarly, half of the participants said the same for their father. Most reported having friend/s who were in recovery (69.3%).

Addiction problems in the social environment of young adults were apparent. More than half (58%) reported having mostly or only friends with an addiction problem, and three-quarters reported having one or more family member with an addiction problem.

Table 3

Psycho-Social Characteristics of Young Adults Seeking Addiction Treatment

	Gender								Number of treatment admissions at Vogur Hospital				History of intravenous drug use							
	Men		Women		N total	p	LowTA ≤ 4		HighTA ≥ 5		n total	p	Never injected drugs (NID)		Have injected drugs (HID)					
	n	%	n	%			n	%	n	%			n	%	n	%	n total	p		
Can seek support from mother when in trouble																				
Often or always	59	67.0	45	70.3	14	58.3	88	.057*	39	67.2	15	71.4	79	***	41	66.1	14	70.0	82	***
Sometimes	10	11.4	9	14.1	1	4.2			7	12.1	1	4.8			7	11.3	2	10.0		
Rarely or never	19	21.6	10	15.6	9	37.5			12	20.7	5	23.8			14	22.6	4	20.0		
Can seek support from father when in trouble																				
Often or always	41	50.6	33	57.9	8	33.3	81	.125*	26	50.0	15	57.1	73	.033*	26	45.6	14	70.0	77	.044*
Sometimes	14	17.3	8	14.0	6	25.0			5	9.6	1	28.6			8	14.0	4	20.0		
Rarely or never	26	32.1	16	28.1	10	41.7			21	40.4	3	14.3			23	40.4	2	10.0		
First degree relative with addiction problem	66	74.2	49	75.4	17	70.8	89	.663*	40	69.0	20	90.0	80	.043*	41	66.1	20	95.2	83	.043*
Have friends who are in recovery	61	69.3	46	71.9	15	62.5	88	.396*	39	68.4	17	77.3	79	.438*	40	64.5	17	81.0	83	.160*
Friends with addiction problem																				
None or few	15	17.1	8	12.3	7	30.4	88	.124*	14	24.6	0	0.0	79	.026*	14	23.0	1	4.8	82	***
Several	22	24.9	18	27.7	4	17.4			14	24.6	5	22.7			18	29.5	1	4.8		
Most or all	51	58	39	60.0	12	52.2			29	50.9	17	77.3			29	47.5	19	90.5		
Child and adolescent psychiatric services	32	36.4	19	29.7	13	54.2	88	.034*	20	35.1	10	45.5	79	.395*	16	26.2	11	52.4	82	.042*
Adult psychiatric hospital admission	31	34.8	22	33.8	9	37.5	89	.748*	15	25.9	13	59.1	80	.005*	16	25.8	13	61.9	83	.003*
Self-harm	62	73.8	39	65.0	23	95.8	84	.004*	38	71.7	17	77.3	75	.619*	41	71.9	16	76.2	78	.707*
Attempted suicide	35	45.5	23	40.4	12	60.0	77	.129*	23	46.9	9	45.0	69	.884*	25	46.3	7	36.8	73	.475*
Ace score																				
0-4 points	27	67.5	21	65.6	6	75.0	40	1.0**	19	70.4	3	50.0	33	.375**	21	72.4	4	50.0	37	.394**
5-10 points	13	32.5	11	34.4	2	25.0			8	29.6	3	50.0			8	27.6	4	50.0		
Should seek further assessment for PTSD	26	60.5	18	52.9	8	88.9	43	.065**	18	60.0	4	57.1	37	1.0**	18	56.3	6	75.0	40	.439*
Have a confirmed psychiatric diagnosis	54	63.5	36	59.0	18	75.0	85	.168*	33	60.0	14	66.7	76	.593*	37	62.7	11	55.0	79	.542*

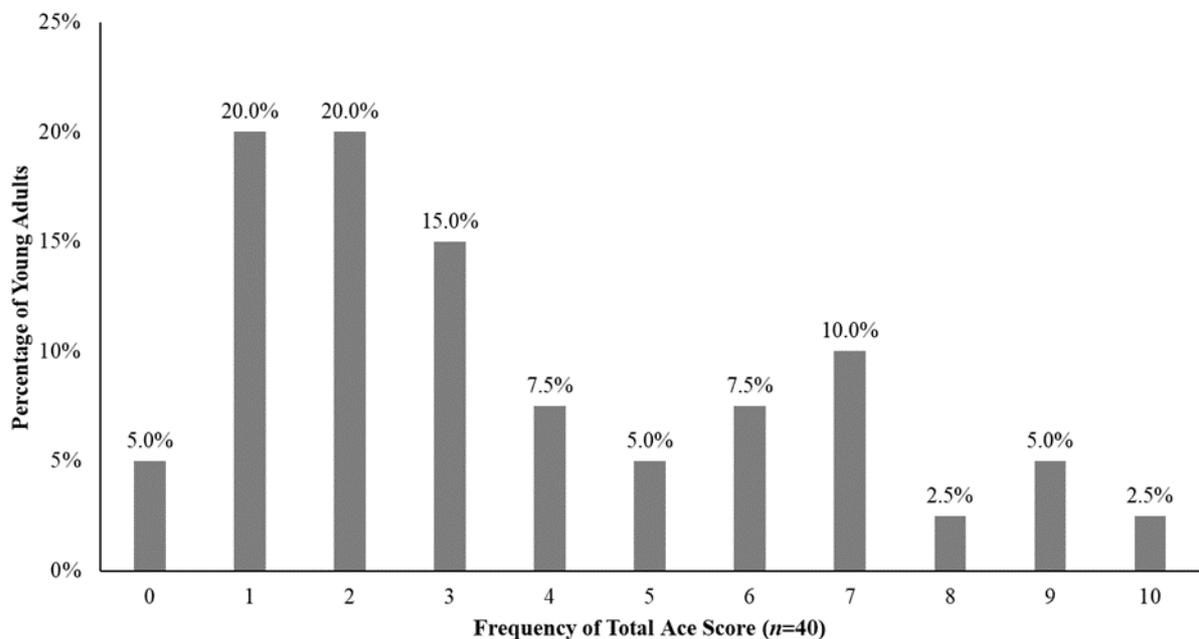
Notes: n total= total number of participants that had records of specified variable, *Pearson Chi-Square test, ** Fishers exact test, ***Premises for Pearson Chi-Square test were not met.

Over 60% of young adults had a confirmed psychiatric diagnosis in addition to substance use disorder, and 48.3% had two or more confirmed psychiatric diagnoses. Furthermore, receiving service/s from Child and adolescent psychiatric services (CAPS) before age 18 was reported by 36.4%, and a similar ratio of participants had a history of adult psychiatric hospital admission. Almost three-quarters of the participants reported having harmed themselves, and having attempted suicide was reported by almost half of the young adults.

Results of PC-PTSD-5 indicated that 60.5% of the patients had trauma symptoms warranting further assessment for PTSD. The mean number of adverse events in childhood was 3.65 events ($SD = 2.72$). However, a third of young adults scored five points or more on the ACE questionnaire, as seen in Figure 2.

Figure 2

Proportion of Young Adults by Total ACE Score

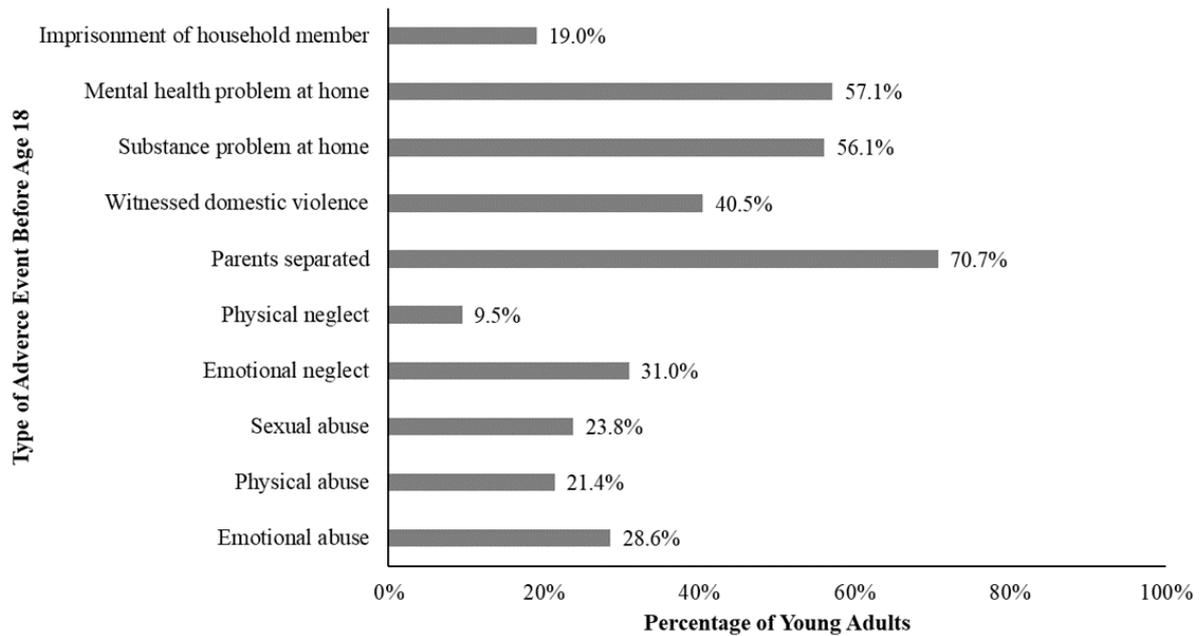


The most commonly reported ACE's were parental divorce, living with a household member with a mental health problem, living with a household member with a substance use

problem, having witnessed domestic violence, and having been emotionally neglected, as seen in Figure 3.

Figure 3

Proportion and Type of Adverse Events Experienced before Age 18 by Young Adults.

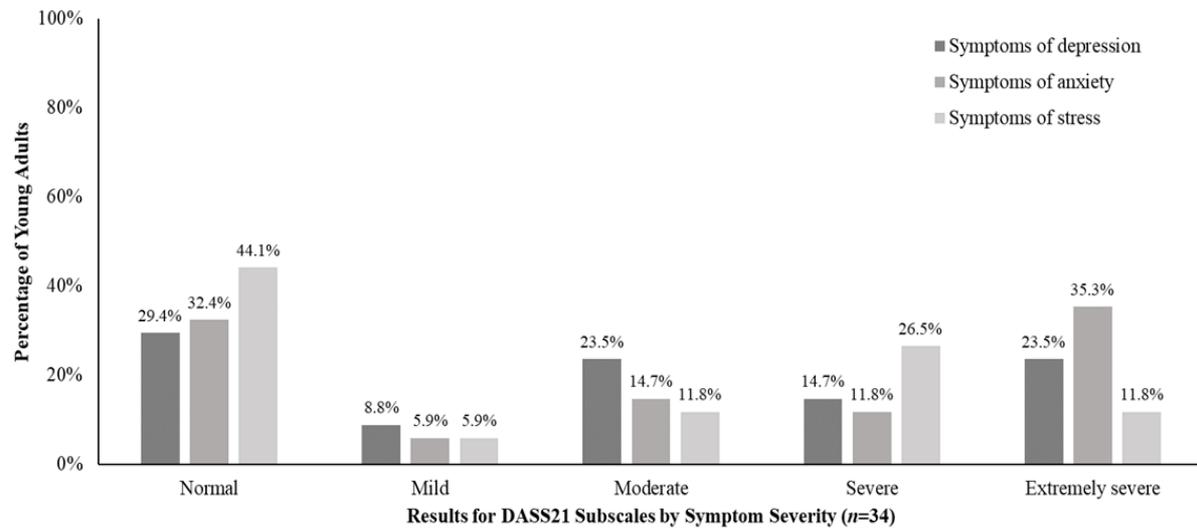


Measures of DASS21 showed considerable variance in well-being between participants. Almost two-thirds of young adults reported moderate to extremely severe symptoms of depression, thereof 23.5% had extremely severe symptoms (see Figure 4). Moderate to extremely severe anxiety symptoms were reported by 61.8% of the participants, thereof 35.3% had extremely severe anxiety symptoms, and half of the participants reported moderate to extremely severe symptoms of stress. Normal symptoms of stress were reported by 44.1% of the participants. Premises for the Chi-square tests were not met for any of the subscales of DASS21 and gender, DASS21 subscales and NOFTA, nor DASS21 subscales and HIDU since the expected count was less than 5 in more than 20% of the cells and is therefore not reported.

Gender differences emerged for various psycho-social characteristics of young adults. First, women reported more often than men that they could never or rarely seek support from

Figure 4

Proportion of Symptoms Severity Reported by Young Adults



their mother (37.5% vs. 15.6% men; NS) or father (41.7% vs. 28.1% men; NS) when in trouble. Second, more women had a history of psychiatric problems: having received services from CAPS before age 18 (54.2% vs. 29.7% men; $\chi^2(1) = 4.52, p = .034$), having confirmed psychiatric diagnosis (75.0% vs. 59.0% men; NS), having harmed-themselves (95.8% vs. 65.0% men; $\chi^2(1) = 8.43, p = .004$), and attempted suicide (60.0% vs. 40.0% men; NS). Moreover, more women had trauma symptoms warranting further PTSD assessment (88.9% vs. 52.9%; NS).

Psycho-social characteristics differed significantly between the HighTA and LowTA groups. Where more HighTA participants had: a family member with an addiction problem (90.0% vs. 69.0% LowTA; $\chi^2(1) = 4.10, p = .043$), mostly or only friends with addiction problems (77.3% vs. 50.9% LowTA; $\chi^2(2) = 7.33, p = .026$), a history of adult psychiatric hospital admission (59.1% vs. 25.9% LowTA; $\chi^2(1) = 7.74, p = .005$).

However, more LowTA reported they could never or rarely seek support from their father when in trouble (40.4% vs. HighTA 14.1%; $\chi^2(2) = 6.81, p = .033$). Similar significant differences emerged between HID and NID participants (40.4% NID vs. 10.0% HID), $\chi^2(2) = 6.24, p = .044$).

Similar differences in psycho-social characteristics emerged between NID and HID participants. More HID participants had: a family member with an addiction problem (95.2% vs. 66.1% NID; $\chi^2(1) = 4.10, p = .043$), a history of adult psychiatric hospital admission (61.9% vs. 25.8% NID; $\chi^2(1) = 8.99, p = .003$), mostly or only friends with addiction problems (90.5% vs. 47.5% NID). Premises for the Chi-square test were not met for the number of friends with addiction problem and HIDU and is therefore not reported.

Furthermore, significantly more HID participants received services at CAPS before age 18 (52.4 vs. 26.2 NID; $\chi^2(1) = 4.84, p = .042$) and more HID participants had trauma symptoms warranting further assessment for PTSD (75.0% vs. 56.3% NID).

Discussion

The aim of this study was to gain a better understanding of the characteristics of young adults seeking addiction treatment in Iceland. Of greatest importance in this study is the finding that young people who present for treatment bring with them a range of complex needs, particularly social, substance use, and mental health issues.

The socio-demographic profile in this study showed that both males and females have educational and employment issues, with the majority having only completed compulsory education and only around third employed. Other serious issues are housing, with one-fifth of the young adults not having stable housing, and criminality, with one-sixth of the sample on probation. This socio-demographic profile is difficult to address in addiction treatment. However, it warrants attention to support young adults in recovery, as is evident by the finding that patients with the most re-admissions have a more serious demographic profile (e.g., unstable housing, on probation) than those with fewer admissions. These findings implicate the need for continued support from social workers following treatment. Ideally, social workers should be working as part of the young adult's multidisciplinary treatment team. A working relationship would then be established and continued support following treatment completion might be easier for both involved.

The findings highlight young people's substance use and treatment profile, showing various trends of those seeking inpatient treatment. Young people have a severe addiction, and the majority are diagnosed with poly-substance use, with cannabis dependence being the most common primary diagnosis. Many report a history of overdose (43%), particularly those with a high number of admissions and who have used drugs intravenously. About one-third of the sample is diagnosed with opioid and/or amphetamine dependence, a much more frequent primary diagnosis among young people with frequent treatment-seeking and a history of intravenous drug use, representing a group with severe substance issues, threatening their well-being. It is promising that majority of the sample (83%) completed treatment at Vogur hospital since treatment completion is one of the most reliable in-treatment factor related to positive outcomes (Brorson et al., 2013; Williams & Chang, 2000).

It is worth noting that a high proportion of young adults seeking treatment reported having a first-degree relative with an addiction problem, consistent with studies on the heritability of addiction (T. Tyrfingsson et al., 2010). Thus, a high proportion of the sample is raised in a family with addiction. It is also of note that most young adults reported being able to seek support from their parents when in trouble; perhaps parental experience with their own addiction, and the trouble that follows, may be helpful when their young adult experiences a similar situation. Another source of support reported are peers, with most young adults reporting having friends in recovery.

Finally, mental health issues were identified among young adults presenting for addiction treatment. A history of psychiatric problems was common, with almost two-thirds reporting a confirmed psychiatric diagnosis, and over one-third had a history of receiving child and adult psychiatric services. Most, and nearly all women, reported self-harm behavior, and almost half reported suicide attempts. Young adults also tended to have a history of adverse childhood events, with one-third having five or more such events before age 18. In line with previous findings, women presented with more severe psychiatric

symptoms (Greenfield et al., 2010; McCrady et al., 2020), and those who used drugs intravenously or had a history of repeated re-admission reported a significantly higher rate of psychiatric hospital admissions. Mental health status thus appears to have an impact on addiction treatment admissions and recovery status, as previous findings have reported (Anderson et al., 2007; Tomlinson et al., 2004).

Other results are in line with previous research, e.g., on socio-demographics with low education status among most of the young adults with addiction (Pálsdóttir et al., 2010; Townsend et al., 2007) and with studies showing the problematic social environment of young adults presenting for treatment with high rates of friends and family members with an addiction problem (Hawkins et al., 1992; Stone et al., 2012; T. Tyrfingsson et al., 2010).

However, self-harm numbers are substantially higher in this study than in other findings, with three-quarters reporting having harmed themselves intentionally and 95% of the women. For example, reported Gupta et al., 2019, a 32.7% occurrence rate of self-harm among their SUD patients. These differences could, however, be explained by different clinical samples and definitions of self-harm. Their sample was male-only, consisting of in- and outpatients. Furthermore, their definition of self-harm did not include “intentional overdose of drugs or narcotics,” which is in the definition for self-harm in the standard interview at Vogur Hospital and could weigh in explaining this difference.

The study's main limitation is that data were collected from existing treatment files. Because of missing data, especially regarding mental health and psycho-social issues, it is likely that the profile described may underrepresent issues faced by young people entering treatment. In addition, given the specific cohort, the results are not generalizable to all other substance-using young adults but are limited to treatment-seeking young adults. The findings, therefore, should be viewed as a profile based on the available clinical data applicable to this clinical cohort in 2021.

The study's strength is that it provides a first and unique profile of young people entering addiction treatment in Iceland, thereby establishing an initial profile of the issues facing young people in addiction treatment. This is an important contribution because it allows for improving the quality of treatment provided.

Given the seriousness of substance use disorders and the disruption it causes in the life of young adults, clinical treatment centers need to be able to provide the most effective and reasonable services. This study provides descriptive data of this group, suggesting how their needs may be met. Clearly, such data are required to guide policymakers and assist in planning addiction services for young people.

Descriptive studies can significantly help explore psycho-social issues, background characteristics, and the treatment profile of young adults in addiction treatment. As stated before, the needs of young adults are not the same as full-grown adults with regards to physical and psychological development, which impacts treatment. Young adults tend to be more impulsive and have less insight into their situation, possibly resulting in premature termination of treatment or unrealistic expectations of their ability to remain abstinent. This developmental stage is also a period of psychological development. Self-image is still emerging, independence and relationship issues are at the forefront, and the foundation is laid for career and family life. Problems with substance use can seriously affect this psychological development and are issues that need to be addressed in treatment with young adults.

This study implicates that special care following treatment is needed for young adults that have attended treatment more than four times or inject drugs. Since homelessness or unstable housing, being on probation, having more severe substance use disorder, and having mostly or only friends with an addiction problem are more common among them. Recovery housing, or preferably residential treatment housing, should be available immediately following treatment to those who fall within this category. People who move into recovery housing have typically decreased substance use and incarceration rates and are more likely to

have higher employment rates than those who return directly to the community after treatment (Jason et al., 2006; Polcin et al., 2010).

Furthermore, results showed that the needs of treatment-seeking young adults do vary but many are in need of some additional support following treatment, e.g., psychological treatment due to mental health problems or social services due to unstable housing. Therefore clinical treatments and aftercare support should aim to be more individualized- and holistic (National Institute on Drug Abuse, 2020).

References

- Anderson, K. G., Ramo, D. E., Schulte, M. T., Cummins, K., & Brown, S. A. (2007). Substance use treatment outcomes for youth: Integrating personal and environmental predictors. *Drug and Alcohol Dependence*, 88(1), 42–48. <https://doi.org/10.1016/j.drugalcdep.2006.09.014>
- Anglin, M. D., Hser, Y.-I., & Grella, C. E. (1997). Drug addiction and treatment careers among clients in the Drug Abuse Treatment Outcome Study (DATOS). *Psychology of Addictive Behaviors*, 11(4), 308–323. <https://doi.org/10.1037/0893-164X.11.4.308>
- Anthony, J. C., & Petronis, K. R. (1995). Early-onset drug use and risk of later drug problems. *Drug and Alcohol Dependence*, 40(1), 9–15. [https://doi.org/10.1016/0376-8716\(95\)01194-3](https://doi.org/10.1016/0376-8716(95)01194-3)
- Antony, M.M., Bieling, P.J., Cox, B.J., Enns, M.V. & Swinson, R.P. (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment*, 10, 176–181. <https://doi.org/10.1037/1040-3590.10.2.176>
- Bahr, S. J., Hoffmann, J. P., & Yang, X. (2005). Parental and peer influences on the risk of adolescent drug use. *The Journal of Primary Prevention*, 26(6), 529–551. <https://doi.org/10.1007/s10935-005-0014-8>
- Brorson, H. H., Arnevik, E. A., Rand-Hendriksen, K., & Duckert, F. (2013). Drop-out from addiction treatment: A systematic review of risk factors. *Clinical Psychology Review*, 33(8), 1010–1024. <https://doi.org/10.1016/j.cpr.2013.07.007>
- Committee on Improving the Health, Safety and Well-Being of Young Adults; Board on Children, Youth, and Families; Institute of Medicine, National Research Council; (2015a). Summary. In R. J. Bonnie, C. Stroud & H. Breiner (Eds.), *Investing in the Health and Well-Being of Young Adults* (1-18). Washington (DC): National Academies Press. <https://www.ncbi.nlm.nih.gov/books/NBK284776/#top>

- Committee on Improving the Health, Safety and Well-Being of Young Adults; Board on Children, Youth, and Families; Institute of Medicine, National Research Council; (2015b). *Young Adults in the 21st Century*. In R. J. Bonnie, C. Stroud & H. Breiner (Eds.), *Investing in the Health and Well-Being of Young Adults* (35-76). Washington (DC): National Academies Press. <https://www.ncbi.nlm.nih.gov/books/NBK284782/>
- Cotto, J. H., Davis, E., Dowling, G. J., Elcano, J. C., Staton, A. B., & Weiss, S. R. B. (2010). Gender effects on drug use, abuse, and dependence: A special analysis of results from the National Survey on Drug Use and Health. *Gender Medicine*, 7(5), 402–413. <https://doi.org/10.1016/j.genm.2010.09.004>
- Deykin, E. Y., & Buka, S. L. (1997). Prevalence and risk factors for posttraumatic stress disorder among chemically dependent adolescents. *Am. J. Psychiatry*, 154 (6) 752–757. [doi: 10.1176/ajp.154.6.752](https://doi.org/10.1176/ajp.154.6.752).
- Dube, S. R., Felitti, V. J., Dong, M., Chapman, D. P., Giles, W. H., & Anda, R. F. (2003). Childhood abuse, neglect, and household dysfunction and the risk of illicit drug use: The adverse childhood experiences study. *Pediatrics*, 111(3), 564–572. <https://doi.org/10.1542/peds.111.3.564>
- Dube, S. R., Williamson, D. F., Thompson, T., Felitti, V. J., & Anda, R. F. (2004). Assessing the reliability of retrospective reports of adverse childhood experiences among adult HMO members attending a primary care clinic. *Child Abuse & Neglect*, 28(7), 729–737. <https://doi.org/10.1016/j.chiabu.2003.08.009>
- Epstein, M., Bailey, J. A., Furlong, M., Steeger, C. M., & Hill, K. G. (2020). An intergenerational investigation of the associations between parental marijuana use trajectories and child functioning. *Psychology of Addictive Behaviors: Journal of the Society of Psychologists in Addictive Behaviors*, 34(8), 830–838. <https://doi.org/10.1037/adb0000510>

- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M. P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, *14*(4), 245–258. [https://doi.org/10.1016/S0749-3797\(98\)00017-8](https://doi.org/10.1016/S0749-3797(98)00017-8)
- Greenfield, S. F., Back, S. E., Lawson, K., & Brady, K. T. (2010). Substance abuse in women. *The Psychiatric Clinics of North America*, *33*(2), 339–355. <https://doi.org/10.1016/j.psc.2010.01.004>
- Guðmundsdóttir, M. L., Sigfússon, J., Tölgyes, E. M., Sigfúsdóttir, I. D., Þórisdóttir, I. E., & Kristjánsson, Á. L. (2019). Ungt fólk 2018 Framhaldsskólar.Rannsóknir og greining. <https://www.rannsoknir.is/wp-content/uploads/2020/04/Ungt-f%C3%B3lk-framhaldsskolanir-2018.pdf>
- Gupta, R., Narnoli, S., Das, N., Sarkar, S., & Balhara, Y. P. S. (2019). Patterns and predictors of self-harm in patients with substance-use disorder. *Indian Journal of Psychiatry*, *61*(5), 431–438. https://doi.org/10.4103/psychiatry.IndianJPsychiatry_578_18
- Hannesdóttir, H., Tyrfingsson, T., & Piha, J. (2001). Psycho-social functioning and psychiatric comorbidity among substance-abusing Icelandic adolescents. *Nordic Journal of Psychiatry*, *55*(1), 43–48. <https://doi.org/10.1080/080394801750093742>
- Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, *112*(1), 64–105. <https://doi.org/10.1037/0033-2909.112.1.64>
- IBM Corp. Released 2020. IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp [Computer software].
- Ingimarsson, B. (2010). Próffræðilegt mat á DASS sjálfsmatskvarðanum þunglyndi, kvíði og streita. [Unpublished Cand.Psych. thesis, University of Iceland]

<https://skemman.is/bitstream/1946/5411/1/Bj%c3%b6rgvin%20Ingimarsson%20-%20DASS.pdf>

Jason, L. A., Olson, B. D., Ferrari J. R., Lo Sasso A. T. Communal housing settings enhance substance abuse recovery. (2006). *Am J Public Health*, 96(10), 1727-1729.

[doi: 10.2105/AJPH.2005.070839](https://doi.org/10.2105/AJPH.2005.070839)

Kelly, T. M., & Daley, D. C. (2013). Integrated treatment of substance use and psychiatric disorders. *Social Work in Public Health*, 28, 388–406.

<https://doi.org/10.1080/19371918.2013.774673>

Khan, M. M. A., Rahman, M. M., Jeamin, S. S., Mustagir, M. G., Haque, M. R., & Kaikobad, M. S. (2020). Psycho-social and socio-environmental factors associated with adolescents' tobacco and other substance use in Bangladesh. *Plos One*, 15(11), 1-17.

<https://doi.org/10.1371/journal.pone.0242872>

Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scale*. Psychology Foundation (2nd. Ed.) Sydney: Psychology Foundation

McCrary, B. S., Epstein, E. E., & Fokas, K. F. (2020). Treatment interventions for women with alcohol use disorder. *Alcohol Research: Current Reviews*, 40(2), 1–18.

<https://doi.org/10.35946/arcr.v40.2.08>

Murphy, A., Steele, M., Dube, S. R., Bate, J., Bonuck, K., Meissner, P., Goldman, H., & Steele, H. (2014). Adverse Childhood Experiences (ACEs) questionnaire and Adult Attachment Interview (AAI): *Implications for parent child relationships*. *Child Abuse & Neglect*, 38(2), 224–233. <https://doi.org/10.1016/j.chiabu.2013.09.004>

National Institute on Drug Abuse. (2018, June 6). *Understanding drug use and addiction drug facts*. National Institute on Drug Abuse.

<https://www.drugabuse.gov/publications/drugfacts/understanding-drug-use-addiction>

National Institute on Drug Abuse (2019, September 13). Marijuana use at historic highs among college-age adults. <https://www.drugabuse.gov/news-events/news-releases/2019/09/marijuana-use-at-historic-highs-among-college-age-adults>

National Institute on Drug Abuse. (2020, June 2). Principles of Adolescent Substance Use Disorder Treatment. <https://www.drugabuse.gov/publications/principles-adolescent-substance-use-disorder-treatment-research-based-guide/principles-adolescent-substance-use-disorder-treatment>

Pálsdóttir, H., Kristjánsson, Á. L., Sigfúsdóttir, I. D., Baldursdóttir, B., & Sigfússon, J. (2010). Ungt fólk utan skóla 2009. Rannsóknir og greining.

<https://www.rannsoknir.is/wp-content/uploads/2020/04/Ungt-folk-utan-skola-2009.pdf>

Polcin, D. L., Korcha, R. A., Bond, J., Galloway, G. Sober living houses for alcohol and drug dependence: 18-month outcomes. (2010) *J Subst Abuse Treat.*, 38(4), 356-65.

[doi: 10.1016/j.jsat.2010.02.003](https://doi.org/10.1016/j.jsat.2010.02.003)

Prins, A., Bovin, M. J., Kimerling, R., Kaloupek, D. G., Marx, B. P., Pless Kaiser, A., & Schnurr, P. P. (2015). *The Primary Care PTSD Screen for DSM-5 (PC-PTSD-5)*. [Measurement instrument].

<https://www.ptsd.va.gov/professional/assessment/screens/pc-ptsd.asp>

Prins, A., Bovin, M. J., Smolenski, D. J., Marx, B. P., Kimerling, R., Jenkins-Guarnieri, M. A., Kaloupek, D. G., Schnurr, P. P., Kaiser, A. P., Leyva, Y. E., & Tiet, Q. Q. (2016).

The primary care PTSD Screen for DSM-5 (PC-PTSD-5): Development and evaluation within a veteran primary care sample. *Journal of General Internal Medicine*, 31(10), 1206–1211. <https://doi.org/10.1007/s11606-016-3703-5>

Prins, A., Ouimette, P., Kimerling, R., Cameron, R. P., Hugelshofer, D. S., Shaw-Hegwer, J., Thrailkill, A., Gusman, F. D., & Sheikh, J. I. (2003). The primary care PTSD screen

(PC-PTSD): Development and operating characteristics. *Primary Care Psychiatry*, 9(1), 9–14. <https://doi.org/10.1185/135525703125002360>

Rothman, E. F., Edwards, E. M., Heeren, T., & Hingson, R. W. (2008). Adverse childhood experiences predict earlier age of drinking onset: Results from a representative US sample of current or former drinkers. *Pediatrics*, 122(2), 298-304. <https://doi.org/10.1542/peds.2007-3412>

Staiger, P. K., Melville, F., Hides, L., Kambouropoulos, N., & Lubman, D. I. (2009). Can emotion-focused coping help explain the link between posttraumatic stress disorder severity and triggers for substance use in young adults? *Journal of Substance Abuse Treatment*, 36(2), 220–226. <https://doi.org/10.1016/j.jsat.2008.05.008>

Stone, A. L., Becker, L. G., Huber, A. M., & Catalano, R. F. (2012). Review of risk and protective factors of substance use and problem use in emerging adulthood. *Addictive Behaviors*, 37(7), 747–775. <https://doi.org/10.1016/j.addbeh.2012.02.014>

Substance Abuse and Mental Health Services Administration. (2020). *Key Substance Use and Mental Health Indicators in the United States: Results from the 2019 National Survey on Drug Use and Health* (HHS Publication No. PEP20-0701-001, NSDUH Series H-55). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. <https://www.samhsa.gov/data/>

Tomlinson, K. L., Brown, S. A., & Abrantes, A. (2004). Psychiatric comorbidity and substance use treatment outcomes of adolescents. *Psychology of Addictive Behaviors*, 18(2), 160–169. <https://doi.org/10.1037/0893-164X.18.2.160>

Townsend, L., Flisher, A. J., & King, G. (2007). A systematic review of the relationship between high school dropout and substance use. *Clinical Child and Family Psychology Review*, 10(4), 295–317. <https://doi.org/10.1007/s10567-007-0023-7>

Tyrfingsson, T., Thorgeirsson, T. E., Geller, F., Runarsdóttir, V., Hansdóttir, I., Bjornsdottir, G., Wiste, A. K., Jonsdottir, G. A., Stefansson, H., Gulcher, J. R., Oskarsson, H.,

- Gudbjartsson, D., & Stefansson, K. (2010). Addictions and their familiarity in Iceland: Familiarity of addiction. *Annals of the New York Academy of Sciences*, 1187(1), 208–217. <https://doi.org/10.1111/j.1749-6632.2009.05151.x>
- Tyrfingsson, Þ. (2019a). *Upplýsingar um heilbrigðisþjónustu SÁÁ 1977-2018*. https://saa.is/wp-content/uploads/2019/11/arsrit2019.glaerur.web_.pdf
- Tyrfingsson, Þ. (2019b). *Upplýsingar um heilbrigðisþjónustu SÁÁ 1977-2018*. https://saa.is/wp-content/uploads/2019/11/arsrit2019.texti_.web_.pdf
- Williams, R. J., & Chang, S. Y. (2000). A comprehensive and comparative review of adolescent substance abuse treatment outcome. *Clinical Psychology: Science and Practice*, 7(2), 138–166. <https://doi.org/10.1093/clipsy.7.2.138>
- Wu, S., Yan, S., Marsiglia, F. F., & Perron, B. (2020). Patterns and social determinants of substance use among Arizona Youth: A latent class analysis approach. *Children and Youth Services Review*, 110, 1-10. <https://doi.org/10.1016/j.childyouth.2020.104769>
- Yule, A. M., Carrellas, N. W., Fitzgerald, M., McKowen, J. W., Nargiso, J. E., Bergman, B. G., Kelly, J. F., & Wilens, T. E. (2018). Risk factors for Overdose in treatment-seeking youth with substance use disorders. *The Journal of Clinical Psychiatry*, 79(3). <https://doi.org/10.4088/JCP.17m11678>
- Zarse, E., Neff, M., Yoder, R., Hulvershorn, L., Chambers, J., & Chambers, R. (2019). The adverse childhood experiences questionnaire: Two decades of research on childhood trauma as a primary cause of adult mental illness, addiction, and medical diseases. *Cogent Medicine*, 6. <https://doi.org/10.1080/2331205X.2019.1581447>

Appendix

Further clarification of study variables

Clinical data used are clinical observations, medical diagnosis, and psychological tests results gathered in standard hospital care, obtained and recorded in patients' medical files by medical and treatment staff of the hospital.

Socio-Demographic-variables

Gender: Participants were categorized as women or men, as was noted in medical records.

Age: as reported in medical records

Residence: The participant's residence was estimated from what municipality was recorded when he/she arrived at treatment. Participants that had reported coming from the municipality of Garðabær, Hafnarfjörður, Mosfellsbær, Kópavogur, Seltjarnarnes, or Reykjavík, were categorized as "living in the capital area." Participants reporting coming from other municipalities were categorized as "living outside of the capital area."

Marital status: as reported in medical records reported by the participant on whether he/she was single, divorced, in a relationship, in a domestic partnership, married, widowed, currently ending a relationship, or going through divorce or dating when in treatment. Participants that were: single, divorced, dating, or ending their relationship were categorized as "Single." Participants who were: married, in a domestic partnership, or relationship, were categorized as "In a relationship."

Children: If medical records had marked yes to children in their file, they were categorized as "has children." If No was marked to children in their file, they were categorized as "having no children."

Living arrangement: Participants' living situation when he/she was entering treatment. Participants were categorized by their recorded living arrangement categories: Own house, renting, living with parents or family in their home, halfway house, homeless, or with no specified home address but may have access to sleeping accommodation. However, participants who had no specified home address but may have access to sleeping accommodation were categorized as "having unstable housing."

Education: Participants were categorized by their recorded highest education completed as noted in medical records. Possible categories were: "did not complete elementary school," "completed elementary school," "completed shorter education in upper secondary school or two years or more in upper secondary school," "completed upper secondary school diploma or craft/technical education in upper secondary school," "studied in university shortly," "completed a university degree."

Examples of completed shorter education in upper secondary school are addiction counselor, medical secretary, and practical nurse.

Having studied in university shortly is based on having at least studied over one semester.

Employment status: Participants were categorized by their reported employment status as documented in medical records: Possible categories were: Unemployed, unsure about employment, steady employment, student, disability benefits, or rehabilitation program. Participants that had marked "unsure about employment" in their file are those who have reported; that they do not know if they will keep their job after treatment, or report being unsure about whether they still have their job, or are not sure if they will get their job again after treatment.

Probation status: Participants were categorized as being on probation if they had answered yes to the question "are you currently on probation according to their medical records."

Treatment variables

Severity of substance use disorder: Participants were categorized as having "mild," "moderate," or "severe" SUD in accordance with SUD diagnoses in medical files made by hospital doctors according to DSM5 criteria for substance use disorder.

Number of treatment admissions: was reported by the participant when asked how often he/she has entered treatment at Vogur Hospital. Participants reporting it was their first to fourth treatment were categorized as "LowTA," whereas participants that were entering their fifth treatment or more were categorized as "HighTA."

Last treatment completion: was reported by the participant when asked whether he/she completed his/her last treatment at Vogur hospital. Participants marked with No were categorized as "not completing last treatment." Participants marked with yes were categorized as "completed last treatment."

Treatment completion in present treatment admission: Participants were categorized as "completed present treatment" if participants' medical records had marked completed treatment in collaboration with the hospital staff recommendation.

However, participants were categorized as "did not complete present treatment" if participants ended treatment prematurely because of any of the following: left treatment without consulting hospital staff, or was suspended from the hospital because of; violent behavior, substance use in treatment, or disciplinary problems.

Premature ending of treatment does not include leaving treatment to receive medical or psychological assistance in another hospital or leaving earlier than the original plan if the decision to leave is made in cooperation with hospital staff.

Age of onset of substance use: Age reported by the participant when asked about when he/she used substances for the first time. If age bracket was recorded in the medical file, e.g., 13-14 years old, was the mean age used (e.g., 13.5 years old).

Age when substance use became problematic: age reported by the participant when asked about when his/her substance use became problematic. If age bracket was recorded in the participant medical file, e.g., 22-23 years old, the mean was used (e.g., 22.5 years old).

Primary substance diagnosis: Is the participant's main substance problem, diagnosed by hospital doctors according to the diagnostic criteria of ICD-9. Participants were categorized by which substance dependence where their primary diagnosis.

Poly-substance use: Participants that were diagnosed as substance dependent on more than one substance according to hospital doctors' diagnoses by ICD-9 criteria were categorized as being poly-substance users.

History of intravenous drug use: participants who have injected drugs several times or regularly at some time in their life were categorized as "HID" (have injected drugs). Participants that had never injected drugs were categorized as "NID" (never injected drugs).

History of drug overdose: Participants were categorized as "having a history of overdose" if they reported yes to the question, "have you ever overdosed?" Overdose is defined as taking drugs or narcotics in excessive amounts and subsequently experiencing an adverse toxic effect.

Psycho-social variables

Family member/first degree relative with addiction problem: Participants were categorized as having a family member (first-degree relative) with an addiction problem if they had answered "yes" to the question, "Do you think any close family member has an addiction problem," and reported that it was their mother, father, or sibling.

Can seek support from mother/father when in trouble: participants were categorized in accordance to their answer to the question "Can you seek support from your parents when you are in trouble?" Answered for each parent: Always, often, sometimes, rarely, or never.

Have friends who are in recovery: participants were categorized as "having friends in recovery" if they answered yes to the question "Do you have friends who have stopped using substances and are in recovery?"

Friends with addiction problem: participants were categorized in accordance to their answer to the question "How many of your friends have addiction problem": None, few, several, most or all.

Confirmed psychiatric diagnosis of other mental disorders: Participants were categorized as "have confirmed psychiatric diagnosis," if they had a psychiatric diagnosis (other than SUD) recorded for the question "Have you ever had a confirmed psychiatric diagnosis from a psychologist or psychiatrist?"

Child and adolescent psychiatric services (CAPS): Participants were categorized as "have a history of receiving Child and adolescent psychiatric services," if they had reported yes to the question "Before the age of 18, did you at any point receive service from Child and adolescent psychiatric services? (For example, Interviews in the outpatient department, admission to the CAPS inpatient department, etc).

Adult psychiatric hospital admission: Participants were categorized as "have a history of adult psychiatric hospital admission" if participant answered yes to the question, "Have you ever been admitted to a psychiatric ward and/or hospital for psychiatric reasons? E.g., due to depression, anxiety, self-harming behavior, or excessive consumption of alcohol and/or drugs.

Self-harm: If the participant reported having intentionally harmed or hurt himself/herself at any time, he/she was categorized as "having a history of self-harm." Examples of self-harm

are cutting, scratching, or scratching to blood. Burn, for example, with a lighter or cigarette. Beat or punch head or hands into hard surfaces. Take an overdose of drugs or narcotics without even wanting or thinking about wanting to die.

History of attempted suicide: Participants are categorized as “have attempted suicide” if they had answered yes to the question, have you ever attempted suicide? Actual attempts or experiments are included.

History of trauma: is assessed by participant answers and total score on the ACEs questionnaire and the Primary Care PTSD-5 Screen.

An Ace score can range from 0-10, with a score of zero indicating no experience of an adverse event before age 18. However, the higher the Ace-score that participant reports, the greater the number of adverse events he/she has experienced before the age of 18.

A score of 3-5 points on PC-PTSD-5 indicates that the participant has experienced a traumatic event in their lifetime, resulting in symptoms that have affected them over the last month, warranting a further assessment for PTSD.

Participant well-being: assessed by participants score on the depression, anxiety, and stress scale 21(DASS-21), with low scores on depression, anxiety, and stress indicating good well-being and higher scores indicating poorer well-being.

	Depression	Anxiety	Stress
Normal	0 – 9	0 – 7	0 – 14
Mild	10 – 13	8 – 9	15 – 18
Moderate	14 – 20	10 – 14	19 – 25
Severe	21 – 27	15 – 19	26 – 33
Extremely severe	28 – 42	20 – 42	34 – 42