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Adolescents with substance abuse problems in outpatient treatment: A one-year prospective follow-up study

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Abstract

Aim: There is a lack of knowledge about how adolescents with substance abuse problems manage after taking part in treatment. It is also difficult to perform traditional follow-up studies with this group. This article presents the outcome of a prospective study of 455 adolescents who underwent outpatient treatment, based on data taken from official registers. It aims to describe and analyse indications of continued use of substance (CUS) and how various risk and protective factors predict outcomes after initiated treatment at a Maria clinic in Sweden. **Design:** The study is based on structured interviews at intake, and the data that indicated CUS were taken from several different national registers. The analyses included descriptive data and bivariate associations, logistic regressions and a CHAID analysis. **Results:** Almost two thirds of the adolescents have no indication of CUS at one-year follow-up. The ten studied risk factors independently were weak predictors of CUS and it was instead the accumulation of risk factors that were linked to a negative outcome. **Conclusion:** The majority of adolescents who start outpatient treatment for substance abuse problems return to a lesser extent in registers that may indicate a continued problem with alcohol and drugs one year later. A concentration of more than five risk factors appears to be

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associated with a registration. The study also provides an example of an alternative method for following up adolescents with alcohol and drug abuse problems.

Keywords
adolescents, follow-up, outpatient treatment, register study, substance abuse

Specialised outpatient care for adolescents with substance abuse problems has increased in scope and is now provided in most municipalities in Sweden (Patriksson, 2014). One form of such outpatient care is delivered at "Maria clinics", where social services and healthcare professionals work together. This system has been highlighted as a good example of specialised substance use care for the target group (Jacobsson et al., 2011; SALAR, 2018). In addition, there is now greater knowledge concerning effective treatment methods for substance-abusing adolescents. In the Swedish context, national guidelines and recommendations have been produced (Swedish National Board of Health and Welfare, 2019). Knowledge about efficacious, community-based outpatient treatment for substance-abusing adolescents is, however, still limited compared to equivalent treatment interventions for adults (Tanner-Smith et al., 2013; Winters et al., 2011), although this is the dominant form of treatment in the area of adolescent substance abuse (Hogue et al., 2018). A Swedish government inquiry on substance abuse found that Swedish research on substance-abusing adolescents is generally incomplete and therefore needs to be reinforced (SOU, 2011). This article presents a prospective study analysing indications of continuing substance abuse problems among adolescents one year after beginning outpatient treatment.

Treatment interventions for substance-abusing adolescents generally aim at cessation of use, although a return to drug use is relatively common (Hser et al., 2001; Williams & Chang, 2000; Winters et al., 2011). Studies have shown that between one third and one half of adolescents treated for alcohol or drug problems will return to using alcohol and drugs to a certain extent within one year post treatment (Grella et al., 2004). In addition, a relatively large percentage commonly begins a new course of treatment during the follow-up period (Godley et al., 2008). International follow-up studies have shown that various outpatient programmes generally contribute to reducing alcohol and drug use, but also that there are large differences in results from one study to the next, for example, with regard to the percentage of adolescents who are abstinent post treatment (Hogue et al., 2014).

Swedish follow-up studies on adolescents with alcohol and drug problems have been conducted to a very limited extent (Jacobsson et al., 2011; SALAR, 2018). Some of these studies were carried out about 30 years ago, and both client groups and interventions for adolescent substance use have changed significantly since then (Bergmark et al., 1989; Söderholm Carpelan, 1992), although some later follow-up studies have been performed (Hodgins et al., 2014; Hodgins et al., 2010; Petrell et al., 2005). The studies were based on various forms of empirical material using different outcome measures, and it has therefore been difficult to compare studies and target groups or to draw conclusions that are more general. Accordingly, there is limited knowledge of how adolescents are managing after taking part in different types of treatment interventions.

It has, however, proven difficult to perform traditional follow-up studies of adolescents with psychosocial problems, as many of them are unwilling to participate or are difficult to reach after treatment has been completed

(Becker et al., 2011; Garner et al., 2007; Nordqvist 2005). Girls appear to be somewhat more willing than boys to participate in follow-up studies (Hodgins et al., 2010; Hser et al., 2001). Adolescents who do not participate in follow-ups often have difficulties in other areas as well, such as family problems, problems in school and delinquency (Meyers et al., 2003). One alternative approach to this type of study might therefore be to use national official registers to follow adolescents who have received treatment interventions in order to monitor their progress. The comprehensive array of registers in Sweden enables studies that can provide new and valuable knowledge.

Background/earlier research

Outpatient treatment outcomes

Overall, it is difficult based on the previous research to get a clear picture of the proportion of adolescents coming to terms with their alcohol and drug problems about a year after they have been subject to outpatient treatment. Most studies include reduced substance use as an outcome measure, while some also specify the percentage that has completely abstained from alcohol and drugs. Several follow-up studies are also aimed at studying the efficacy of specific treatment methods or the predictive power of various factors, and these do not always report specified treatment outcomes. A summary of earlier follow-up studies one year post treatment follows.

The percentage of adolescents who have completely abstained from using alcohol and drugs varies widely in follow-up studies, from one tenth (Hendriks et al., 2011) to about one third (Dennis et al., 2004; Hser et al., 2001), to about one half of the adolescents studied (Latimer et al., 2000; Pedersen & Frederiksen, 2012; Smith et al., 2011). One research review found that the average rate of sustained abstinence from drugs at 12 months post treatment was 32% (Williams & Chang, 2000). Several studies also reported clear reductions in alcohol and drug use (Dennis et al., 2004; Hendriks et al., 2011; Hser et al., 2001).

In a Swedish evaluation of an outpatient programme for adolescents with cannabis problems, 67% of those who completed treatment had ceased their cannabis use one year after (Petrell et al., 2005). Dropout was relatively large, however, as one-third – 25 of the 75 adolescents who began the programme – abandoned treatment early. Another Swedish one-year follow-up study of 156 alcohol- or substance-abusing adolescents who came into contact with an addiction clinic showed that 57% of the adolescents also began treatment (Hodgins et al., 2010). The improvements were non-existent for those with severe alcohol problems, and the proportion of adolescents with pronounced drug problems increased from 23% to 28% during the follow-up period.

Risk and protective factors that predict outcomes

The concept of *risk and protective factors* is useful in studies of adolescents with substance abuse problems. These are categorised in relation to four levels: the community, school, family, and the individual and their peers (Stone et al., 2012). There is a significant cumulative effect, in that the more risk factors are present, the greater the likelihood that a substance use problem will develop (Hawkins et al., 1992). Several of these factors have also proven to be predictive of various types of treatment outcomes (Fleming et al., 2010; Shekhtmeyster et al., 2011). A fundamental idea in treatment is to reduce the risk factors present for individuals while strengthening the protective factors.

Girls in outpatient treatment generally have more serious substance use problems (Anderberg & Dahlberg, 2018), but they often have better treatment outcomes than boys (Chi et al., 2014; Latimer et al., 2000), although some studies have shown little or no gender differences with regard to the change trajectory (Anderson et al., 2007; Hodgins et al., 2014; Pedersen & Frederiksen, 2012). Age at baseline

seems to have little significance for outcome (Hogue et al., 2014; Tanner-Smith et al., 2013), and ethnicity does not predict any differences in treatment outcomes regarding substance use for adolescents who participate in treatment (Tanner-Smith et al., 2013). Higher motivation at baseline is, however, predictive of a better outcome at follow-up (Breda & Heflinger, 2007; Chi et al., 2014; Goodman et al., 2011).

Several studies have identified early alcohol or drug debut as a strong predictor of substance use persistence in early adulthood (Latimer et al., 2000; von Sydow et al., 2001, 2002; Winters et al., 2014). Some studies also show that more serious substance abuse problems at baseline generally result in poorer treatment outcomes (Babbin et al., 2016; Godley et al., 2004). At the same time, adolescents with more serious problems when treatment is begun can demonstrate relatively greater progress in treatment than adolescents with less serious problems (Godley et al., 2014; Hogue et al., 2018; Latimer et al., 2000). Improvements in treatment seem to occur more often for adolescents who are abusing cannabis than for those who are abusing alcohol (Tanner-Smith et al., 2013), although weekly use of cannabis prior to treatment seems to be a critical threshold for continued drug use (Swift et al., 2008).

Co-occurring mental health problems among adolescents with drug abuse have been shown in several studies to result in poorer treatment outcomes and greater risk of relapse compared to adolescents who only have drug abuse problems (Armstrong & Costello, 2002; Bender et al., 2006; Couwenbergh et al., 2006; Deas, 2006; Hulvershorn et al., 2015; Jacobsson et al., 2011; Waldron et al., 2005). Other studies show no differences in treatment outcomes between adolescents with or without psychiatric comorbidities (Battjes et al., 2003; Bertrand et al., 2013; Godley et al., 2014; Grella et al., 2004; Pagey et al., 2010; Rowe et al., 2004; Tanner-Smith et al., 2013). There are also studies that have shown comparable or even better outcomes for adolescents with psychiatric comorbidities with regard to reduced drug use compared to adolescents who only have a drug abuse problem (Becker et al., 2011; Godley et al., 2014; Pagey et al., 2010; Stevens et al., 2004; Tamm et al., 2012).

The absence of close relationships with both parents before, during and after treatment is linked to continued use of substances at follow-up (Pedersen & Frederiksen, 2012). Exposure to violence in various forms during childhood can adversely affect adolescents' commitment to treatment, and exposed individuals are more likely to discontinue treatment early (Simpson & Miller, 2002; Spooner, 1999). Other studies show that treatment outcomes for adolescents with experience of victimisation do not generally differ from those of adolescents without these experiences (Grella & Joshi, 2003).

Good connections to school while undergoing treatment is an important protective factor and has been shown to support positive treatment outcomes (Latimer et al., 2000). Not socialising with delinquent peers is also related to a higher rate of post-treatment sobriety (Anderson et al., 2007; Becker et al., 2011; Latimer et al., 2000; Pedersen & Frederiksen, 2012). On the other hand, a connection has been shown between a history of criminal offences and continued substance abuse after treatment (Waldron et al., 2005).

Aim

The article presents the results of a longitudinal/prospective study of adolescents with substance abuse problems who undergo outpatient treatment, based on data taken from official registers. It aims to describe and analyse indications of continued use of substances (CUS) and how various risk and protective factors predict outcomes after initiated treatment contact at a Maria clinic.

Methods

The current study was carried out within the framework of a research project, Treatment Research on Adolescents at the Maria clinics

(TRAM). The central aim is to study adolescents' change trajectories with regard to alcohol and drug use, mental health and social situation, and how specific risk and protective factors affect outcomes for various groups post outpatient treatment (Anderberg et al., 2019). The study has been ethically approved (Ref. no. 2015/160-31).

The project combines naturalistic data from structured interviews with adolescents at intake and data from various registers at follow-up one year after baseline. Similar strategies have been successfully used in several Swedish studies to follow up children and adolescents placed in various forms of institutional care or sentenced to custodial care or imprisonment (e.g., Franzén et al., 2008; Fridell et al., 2009; Pettersson, 2010; Sallnäs & Vinnerljung, 2009; Shannon, 2011; Vinnerljung & Ribe, 2001).

Participants

Initial data collection was carried out at Maria clinics in 12 cities: Stockholm, Gothenburg, Malmö, Linköping, Helsingborg, Norrköping, Eskilstuna, Södertälje, Kristianstad, Solna, Hässleholm and Sundbyberg. The clinics are specialised outpatient units for substance-abusing adolescents and are operated in co-operation with social services and the healthcare system. All clinics offer various forms of individualised and/or manual-based treatment of alcohol and drug use problems, for example Motivational Enhancement Therapy (MET) and Functional Family Therapy (FFT). The average episode of care is 4–6 months.

All adolescents aged 15 years and above who initiated contact with the Maria clinics in 2016 (932 individuals) were informed and asked about participation in the study by the therapist in question, and 469 chose to participate. There were no register data available for 12 individuals due to incomplete civic registration numbers or migration out of Sweden, and two adolescents had died during the follow-up period. Thus, a total of 455 adolescents participated in the follow-up study reported here.

Non-participation

A non-response analysis showed that the study group (455 individuals) had somewhat more serious substance use problems compared to the group (477 individuals) who opted not to participate in the study. The study group consisted of 29% girls, while the percentage of girls in the non-response group was 22%. The median age was 17 years in both groups. Regarding primary drug, both groups reported a similar pattern. Percentages reported in the study group were 76% for cannabis, 14% for alcohol and 10% for other drugs. The figures in the non-response group were 79% for cannabis, 13% for alcohol and 8% for other drugs. There were significant differences in other variables related to substance use, and the study group generally had more serious substance use problems compared to the non-response group in terms of higher frequency of substance use (51% versus 41%), higher extent of mixed substance use (38% versus 26%) and a larger proportion with previous substance abuse treatment (31% versus 20%). This result differs from earlier follow-up studies, in which, on the contrary, groups that opted not to participate often had more serious problems (Meyers et al., 2003). It is likely that the differences can be partially explained by the somewhat larger proportion of girls – who generally have higher psychosocial loads – in the study group (see Anderberg & Dahlberg, 2018).

Measures and outcomes

When the treatment process began, initial data collection began via intake interviews. The purpose of the structured interview is to identify problems, needs and the current situation to enable relevant assessment, planning and delivery of treatment. The interview contains a total of 75 questions covering the following 10 aspects of life: housing and financial support, occupation, treatment history, criminality, childhood, exposure to violence, family and relationships, physical health, mental health, as well as alcohol and drug use. It also covers

administrative data, sociodemographic data, information concerning ongoing treatment contacts, and some concluding open questions.

The outcome measures used to analyse treatment results were based on experience gained in earlier studies and provided a multifaceted and reliable picture of the adolescents' progress (see, e.g., Sallnäs & Vinnerljung, 2009). Data that indicated CUS were taken from several different national registers. Renewed contact with a Maria clinic was taken from UngDOK. Incidence of substance use disorders (according to ICD-10) in connection with outpatient and inpatient physical, psychiatric and addiction care was obtained from the National Board of Health and Welfare's Patient Register. Information about medication for alcohol and drug use disorders was found in the National Board of Health and Welfare's Pharmaceutical Register. The incidence of compulsory care for substance use disorders was taken from the National Board of Health and Welfare's Compulsory Care Register. Substance use-related criminality, such as drugs offences or drink driving, was found in the Processed Offences Register kept by the Swedish National Council for Crime Prevention.

Table 1. Indication of continued substance abuse problems at one-year follow-up. The data are presented as percentages. Gender differences were tested with a chi^2 test.

	Total $n = 455$	Girls $n = 133$	Boys $n = 322$	p-value
Indication of CUS	37%	32%	40%	ns
Renewed contact with Maria clinic	6%	8%	4%	ns
Outpatient substance abuse care	20%	15%	22%	ns
Inpatient substance abuse care	9%	10%	9%	ns
Medication for alcohol or drug abuse problems	–	–	–	–
Compulsory care	1%	1%	1%	ns
Substance use-related criminality	17%	4%	22%	*

Note. ns = not significant; CUS = continued use of substance.
*$p < 0.05$.

Analysis

The first analyses included descriptive data and bivariate associations between risk factors and the indication of CUS. Next, logistic regressions were used to describe the predictive value of the risk factors for CUS. This was done with and without control for gender, age and prior drug use frequency (of the primary drug). In addition, separate analyses were carried out to investigate the impact of a cumulative risk load. When treating the 10 risk factors as a composite index, the internal consistency was 0.60. Finally, to explore specific risk configurations that increase or decrease the risk of CUS, a CHAID analysis (Chi-square Automatic Interaction Detection; Kass, 1980) was conducted. CHAID is a data-mining method that maximises the chi-square at each node in a decision tree. This is done stepwise until a stopping criterion is set (in this case a non-significant chi-square). The value of this is to find complex interactions that could be further investigated. A comprehensive description of the method is found in Ritschard (2013).

Results

The first stage describes the proportion of adolescents who were found in any type of official register at one-year follow-up, due to continued substance use. Table 1 shows no indication of CUS in the various registers one year after baseline for a total of nearly two thirds of the adolescents (285 individuals). Of the others, 6% had a new contact with a Maria clinic, 20% had received outpatient care and 9% had received

Table 2. Odds ratios (*OR*s) and confidence intervals (CIs) for the association between adolescent risk factors and continued use of substance ($n = 446$).

	Bivariate associations	Model 1	Model 2 Full model
	OR (95% CI)	*OR* (95% CI)	*OR* (95% CI)
1. Lack of occupation	1.59 (0.98–2.56)	1.26 (0.76–2.10)	1.27 (0.73–2.20)
2. Problems at school	1.78 (1.12–2.84)*	1.39 (0.85–2.28)	1.41 (0.86–2.34)
3. Placement in foster care/residential home	1.46 (0.92–2.32)	1.28 (0.79–2.09)	1.28 (0.78–2.10)
4. Problems in childhood environment	1.21 (0.82–1.78)	0.92 (0.59–1.43)	0.88 (0.57–1.38)
5. Early age at onset of substance use	1.37 (0.87–2.14)	1.18 (0.74–1.91)	1.19 (0.73–1.93)
6. Delinquent peers	1.87 (1.18–2.98)**	1.71 (1.06–2.76)*	1.53 (0.93–2.52)
7. Exposed to violence/abuse	1.35 (0.91–2.00)	1.07 (0.69–1.67)	1.14 (0.72–1.81)
8. Depression	1.62 (1.09–2.42)*	1.27 (0.82–1.99)	1.30 (0.81–2.09)
9. Violent behaviour	1.72 (1.10–2.70)*	1.40 (0.87–2.27)	1.38 (0.84–2.25)
10. Traumatic events	1.52 (1.02–2.25)*	1.19 (0.76–1.84)	1.32 (0.83–2.07)

Notes. Model 1 includes risk factors 1–10 and Model 2 risk factors 1–10 but also age, gender and primary substance use frequency at intake.
*$p < 0.05$. **$p < 0.01$.

inpatient care in some form within the addiction or psychiatric care system. No register data were found on medication specifically for alcohol or drug use disorders, while 1% of participants had been in mandatory treatment and care through the Swedish law and 17% had been convicted of substance use-related offences. These separate indicators were somewhat overlapping, and, in all, 37% ($n = 170$) showed at least one indication of CUS over the follow-up period of one year.

There is a difference between the sexes: 68% of the girls had no indication of continued alcohol or drug problems, while the corresponding figure for the boys is 60%, but this difference is not significant. As to the specific indicators, there is a clear and significant difference between boys and girls with regard to substance use-related criminality.

The significance of various separate risk factors for the likelihood that an adolescent would show indications of CUS was analysed in the next stage. Bivariate analyses (Table 2) showed that five risk factors – problems at school, delinquent peers, depression, violent behaviour and traumatic events – were all positively associated with CUS. In addition to the bivariate analyses, we included the risk factors simultaneously in Model 1 (Nagelkerke $R^2 = 6.4\%$) and with inclusion of age, gender and primary drug use frequency at intake (Nagelkerke $R^2 = 8.2\%$). When the risk factors were included in the same model and after controlling for age, gender and prior substance use frequency, none of these associations remained significant (see Model 2 in Table 2). The explanatory value of separate risk factors ranged from none to modest, with odds ratios (*OR*s) ranging from 0.88 to 1.53 in the full model.

Next, we analysed the extent to which the cumulative risk in terms of the number of risk factors could predict CUS (Table 3). Both the bivariate association and the full model that also included age, gender and primary substance use frequency at intake (Model 3; Nagelkerke $R^2 = 6.9\%$) showed that there was a substantial increase in risk (more than threefold) for the group that showed more than five risk factors.

Finally, a CHAID analysis was done to explore interactions that might increase or decrease the risk of CUS (Table 4). The

Table 3. Odds ratios (*OR*s) and confidence intervals (CIs) for the association between adolescent cumulative risk and continued use of substance ($n = 446$).

	Bivariate association *OR* (95% CI)	**Model 3 Full model** *OR* (95% CI)
0–2 risk factors ($n = 135$)	1	1
3–5 risk factors ($n = 217$)	1.58 (1.00–2.51)	1.60 (0.98–2.59)
6–10 risk factors ($n = 94$)	3.05 (1.76–5.29)**	3.14 (1.73–5.71)**

Note. Model 3 includes both the level of cumulative risk and also age, gender and primary substance use frequency at intake. *$p < 0.05$. **$p < 0.01$.

Table 4. Summary of a CHAID analysis using indications of continued use of substance (CUS) as dependent variable ($n = 455$).

Node configuration	**Cases**	**Proportion with CUS within node**
Split 1 (chi-square = 7.10; $df = 1$; $p = 0.008$)		
Delinquent peers	$n = 91$	49.5%
No delinquent peers	$n = 364$	34.3%
Split 2 (chi-square = 5.35; $df = 1$; $p = 0.021$)		
No delinquent peers; violent behaviour	$n = 77$	45.5%
No delinquent peers; no violent behaviour	$n = 287$	31.4%
Split 3 (chi-square = 4.21; $df = 1$; $p = 0.040$)		
No delinquent peers; no violent behaviour, boys	$n = 203$	35.0%
No delinquent peers; no violent behaviour, girls	$n = 84$	22.6%

analysis showed that the group with delinquent peers had a 49.5% risk of CUS compared to the girls without delinquent peers or violent behaviour, who showed a 22.6% risk of CUS.

Discussion

The results of the study show that almost two thirds of adolescents who begin outpatient treatment at a Maria clinic show no indication of CUS at one-year follow-up. That such a large proportion of adolescents do not appear in any of the relevant registers can have a variety of explanations. One possible explanation of the result is that the study group is heterogeneous; for many adolescents, drug use is an experimental and transient phase in life, and many adolescents stop using drugs in young adulthood in spite of relatively extensive use as teenagers (von Sydow et al., 2001). The sample in this study generally had somewhat more serious alcohol and drug use problems, but adolescents with more extensive substance abuse problems can also show greater progress than adolescents with less severe problems (Godley et al., 2014; Hogue et al., 2018).

Another hypothesis is that the results could be ascribed to the Maria clinics that provide specialised outpatient care aimed at supporting adolescents and young adults with alcohol and drug use problems. Care is delivered at the clinics in close co-operation with social services and the healthcare system, which involves a wide array of evidence-based, coordinated psychosocial and medical interventions that can be adapted to the specific needs of adolescents (cf. Jacobsson et al., 2011). The outcome can probably also be linked to other social factors and concurrent changes in other areas, such as better relationships with parents, opportunities for further education or other occupation, and changes in peers.

The result should be interpreted with some caution, as the relevant registers do not pick up adolescents who "fly below the radar" and may persist in their problematic drug use without having any contact with the relevant clinics, the healthcare system or the legal system. On the

other hand, this type of information also contains a certain degree of over-estimation, in that isolated appointments within, for example, outpatient care indicate CUS, even though the adolescents may have sought care for a temporary setback or crisis where certain support was provided to avoid a relapse.

The results also indicate that a somewhat lower percentage of girls than boys have a registration of CUS, although the difference is not significant. That the percentage of those with less negative outcomes is higher among girls is consistent with other studies (Chi et al., 2014; Latimer et al., 2000; Pedersen & Frederiksen, 2012). The incidence of indications of CUS in various national registers is otherwise similar between girls and boys, except for substance use-related criminality, such as drugs offences and drink driving, where the incidence is substantially higher for boys. Significant gender differences in criminality among adolescents with substance use problems have been reported in several studies (Grella & Joshi, 2003; Rounds-Bryant et al., 1998; Shane et al., 2006).

The results show that the ten studied risk factors independently are weak predictors of CUS. This conclusion is consistent with earlier studies, and the conclusion is that there is a lack of consensus as to the predictive or moderating effect of isolated factors in connection with outpatient treatment (Hogue et al., 2018).

However, the exploratory CHAID analysis provides some guidance related to the risk factors and combinations of risk factors that could increase or decrease the risk for CUS. The analysis shows that the combination of three factors – no delinquent peers, no violent behaviour and male gender – halves the risk of CUS compared to the isolated risk factor of delinquent peers. This result is supported by a large number of studies showing that violent and aggressive behaviour (primarily among boys) can be difficult to handle and successfully address in treatment (Babbin et al., 2016; Deas, 2006). Socialising with delinquent peers who abuse drugs and commit crimes is a noted factor in earlier studies (Stone et al., 2012). For an adolescent, such a change may be a huge challenge because access to prosocial peers may be very limited, and support from family and treating professionals may be required to establish new prosocial relationships. It is instead the accumulation of risk factors that is linked to a negative outcome, which is another important result. If an adolescent has more than five risk factors, there is consequently a significantly elevated risk of CUS. This cumulative effect is highly consistent with the conclusions of previous studies of the same target group (Anderberg & Dahlberg, 2018; Hawkins et al., 1992; Ostaszewski & Zimmerman, 2006).

There may be both methodological and actual causes behind the fact that multiple risk indicators are more predictive of CUS than isolated risk factors. One can expect higher reliability in data where there are many indicators of problem load, but it is also reasonable to expect that change and abstinence may be achievable even if there are problems in individual life domains, while it may be insurmountable if the problems span multiple life domains. The cumulative problem weight can also be a challenge for the outpatient clinics that meet the target group in question.

Strengths and weaknesses of the study

The reported study is part of a research project on outpatient treatment of substance-abusing adolescents in a naturalistic context, with follow-ups at one and three years. One limitation of register follow-up, however, is that certain central variables, such as frequencies of continued substance use, do not appear in official registers. Another limitation is that CUS is not always detected through registers, which may lead to an underestimation. Combining information from structured interviews at baseline and several different register sources at follow-up produces reliable data and is likely to increase the occurrence and may be an innovative method for addressing the common problem of non-participation. It is also a strength of

the study that the adolescents represent several Maria clinics in different cities, which contributes to greater generalisability to adolescents in outpatient care.

Implications of the study

Outpatient care is the most common form of care for substance-abusing adolescents in Sweden and in other countries, and more knowledge and continued research is required concerning this particular form of care. The result concerning the cumulative effect has a clear clinical implication for the importance of performing baseline assessments in connection with treatment of substance use problems. Particular attention and co-ordinated interventions should be directed at adolescents with more serious problems, to support greater progress, if possible. The accumulation of five risk factors seems to be a key cut-off point. Notwithstanding that, it may be essential to consider individual risk factors for certain individuals. Adolescents with serious substance abuse problems and co-occurring mental health problems should receive integrated or parallel treatment to achieve a positive outcome (Morisano et al., 2014). Parental support and involvement in the treatment intervention has also been shown to have a positive impact on the outcome (Hogue et al., 2018).

Conclusion

This is the first Swedish study in which reported outpatient substance abuse treatment has been studied to a greater extent. The study shows that nearly two thirds of the adolescents who begin treatment at a Maria clinic show no indications of CUS at one-year follow-up. The concentration of more than five risk factors is associated with a negative outcome. The study also provides an example of an alternative method for following up adolescents with alcohol and drug abuse problems.

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