An open trial investigation of Treatnet Family among adolescents with substance use problems

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ABSTRACT

Introduction: Studies that used evidence-based family therapies have demonstrated significant effects in reducing adolescent drug use and delinquent behaviours, and in reducing comorbid mental health problems. However, almost all these studies were conducted in high-income countries. The overall aim of the present study was to explore the effect of United Nations Office on Drugs and Crime's (UNODC) Treatnet Family (TF) in reducing substance consumption, drug-related activities, reducing mental health problems, and in improving family interaction among adolescents with substance-use problems.
Method: Nineteen adolescents who had been referred to a community counselling clinic because of substance-use problems and their parents/family members participated in TF. They completed a set of questionnaires to measure substance use, family functioning, mental health problems, and life events at pre-, post-intervention as well as at a one month-follow-up assessment.
Results: TF had a positive significant impact in reducing alcohol use among adolescents with substance-use problems. The number of adolescents who smoked cigarettes and marijuana, and used amphetamines reduced across time. After participating in TF, the adolescents were involved with significantly fewer friends who consumed substances and participated in antisocial behaviours. Furthermore, parent/family member reported a significant decrease in mental health problems, and positive changes in adolescent's behaviours.
Conclusion: The TF had a positive impact in reducing alcohol consumption and problems related to substance consumption among adolescents with substance-use problems when delivered by practitioners in routine community settings.

1. Introduction

Adolescence is the developmental stage during which substance use often occurs for the first time (Degenhardt, Stockings, Patton, Hall, & Lynskey, 2016; Thatcher & Clark, 2008). Some substances such as alcohol, tobacco, and marijuana are common in this age group (ESPAD Group, 2020). Experimental or occasional use of substances during adolescence have been identified as a strong predictor for the development of substance use disorders (SUDs) in adulthood (McCambridge, McAlaney, & Rowe, 2011). The lifetime prevalence of SUDs among adolescents have been reported to range

from 3% to as high as 32% (Fergusson, Horwood, & Lynskey et al., 1993; Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993; Feehan, McGee, Nada-Raja, & Williams, 1994; Merikangas, Jian-ping, Burstein, et al., 2011; Swendon, Burstein, Case, Conway, Dierker, Je, & Merikangas, 2012).

Studies reporting the prevalence of SUDs in low- and middle-income countries (LMICs) is limited. According to the Global School-based Student Health Survey (GSHS), 2% of adolescents reported using cannabis, with the highest prevalence in the Americas region (7%) (WHO, 2019). Approximately 25% of adolescents in the GSHS had consumed alcohol in the past 30 days, and 17.9% of them had been intoxicated at least once

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during their lifetime (Ma, Bovet, Yang, Zhao, Liang, & Xi, 2018). Adolescents with the highest prevalence of alcohol consumption were in Seychelles (57%), whereas the country with the lowest prevalence of alcohol use was in Tajikistan (0.8%). In Indonesia, according to a recent survey conducted by the National Anti-Narcotics Agency (Badan Narkotika Nasional; BNN) and the Indonesian Institute of Sciences (BNN, 2020), the lifetime prevalence of drug consumption among young people was 5.8%. The lifetime prevalence of drug consumption among students in junior high schools, high schools and colleges were 4.8%, 6.4%, and 6.0%, respectively. The commonly used drugs were cannabis, gorilla, amphetamine (shabu), dextromethorphan, heroine, and cocaine, as well as psychotropic pills (e.g, Tramadol and different kinds of painkillers or analgesics), inhalant, and morphine (BNN, 2019). The rate for alcohol consumption was 3.7% for the 15–19 olds, and 6.4% for the 20–24 olds.

SUDs also frequently co-occur with emotional disorders such as anxiety and depression (Fergusson et al., 1993; Rohde, Lewinsohn, & Seeley, 1996; Kilpatrick, Acierno, Saunders, Resnick, Best, & Schnurr, 2000) as well as with antisocial behaviours such as involving with violence (Matykiewiecz, La Grange, Reyes, Vance, & Wang, 1997). Furthermore, adolescents with SUDs often have impairments in various life domains, including increase in family conflict, decline in academic functioning, violence, and recurrent social or interpersonal problems (Essau, 2011).

1.1. Risk factors associated with SUDs: Family factors and peer relationship

Accumulative number of studies have examined factors that put adolescents at risk of developing SUDs. Of all the factors examined, family factors have consistently been identified as strong predictors of SUDs. These family factors include poor parent-adolescent relationship quality, inadequate parental support, poor parental monitoring, ineffective behaviour management, and parental and sibling substance use (Carver, Elliott, Kennedy, & Hanley, 2017; Hutchinson, Mattick, Braunstein, Maloney, & Wilson, 2014; Straussner & Fewell, 2018; Yap, Cheong, Zaravinos-Tsakos, Lubman, & Jorm, 2017; Vermeulen-Smit, Verdurmen, Engels, & Vollebergh, 2015). However, other family factors such as positive parental-adolescent involvement, or appropriate monitoring have been reported to confer a protective effect of adolescent substance use (Essau & Delfabbro, 2020).

While parents and family members have a significant influence during childhood, peer influence become more important during adolescence (Schuler, Tucker, Pedersen, & D'Amico, 2019). Thus, not surprisingly, affiliating with peers who use substances has been identified as one of the strongest predictors of adolescent substance use (Kirst, Mecredy, Borland & Chaiton, 2014). In explaining this finding, it has been argued that friends promote substance use through increased accessibility to substances, and shape positive attitudes about their use (Bose et al., 2018; Tarantino et al., 2014; Van Ryzin & Dishion, 2014). Having peers who consume drugs and who are engaged in antisocial behavior, school truancy, and risky sexual behavior have also been found to amplify alcohol misuse in adolescents (Tarantino et al., 2014; Van Ryzin & Dishion, 2014). However, the negative influences from peers on adolescent substance use could be mitigated by parental factors such as through parental monitoring and strong disapproval of drug use (Chan, Kelly, Carroll & Williams, 2017; Marschall-Lévesque, Castellanos-Ryan, Vitaro, & Séguin, 2014). The extent to which these family and peer factors may also put the adolescents at risk to developing substance use problems among adolescents in low- and middle-income countries is unclear.

1.2. Intervention

Given the important role that parents and family members have on the development and maintence of SUDs in adolescents, it is not surprising that family therapy has been an intervention of choice for the prevention and treatment of SUDs among adolescents. Studies that used

evidence-based family therapies have demonstrated significant effects in reducing adolescent drug use and delinquent behaviour (Rigter, Henderson, Pelc, Tossmann, Phan, Hendriks et al., 2013), recidivism (Sexton & Turner, 2010) and substance use among youths at high risk of gang involvement (Thornberry, Kearley, Gottfredson, Slothower, Devlin, & Fader, 2018), as well as in reducing mental health problems (Essau & Delfabbro, 2020). Family therapy has also been reported to successfully engage and retain difficult adolescents and family members (Essau & Delfabbro, 2020). However, almost all these studies were conducted in high-income countries and almost all of them were conducted within a research context in university setting. As such, the findings might not be generalisable to studies conducted in a LMICs such as in Indonesia. Furthermore, adolescents with SUDs and their families in LMICs do not have or very little access to effective treatment such as family-based therapy. To address this accessibility gap as well as to increase quality and diversity of treatment options for adolescents with drug and other SUDs, the Treatnet Family (TF) was developed by the United Nations Office on Drugs and Crime (UNODC, 2020).

TF contains elements of evidence-based family therapy which has been developed specifically for adolescents with SUDs and their families in low resource settings. TF focuses on family interactions and uses elements of family therapy to interrupt ineffective communication within the family. It contains the key components of family therapy, such as

- positive reframing (i.e., positive labeling of a negative behavior without necessarily accepting it as fine. It involves emphasizing the possible positive intent behind a seemingly negative behavior),
- positive relational reframing (i.e., positive labeling of a negative behavior in relationship to the family without necessarily accepting it as okay. Even when the behavior is self-destructive, the intent behind it can be understood and appreciated, yet not necessarily condoned).
- perspective taking (i.e., developing empathy and the ability to take another person's viewpoint into account).
- relational questions (i.e., to support perspective taking, relational questions are asked [e.g., "When Narendra gets into trouble, who feels most sorry for him?"] in order to encourage perspective taking and relational thinking).
- going with resistance (i.e., helping family members feel heard and understood, which reduces defensiveness and makes more productive conversations possible).

TF has six sessions, with each session lasting between 90 and 120 min. Each session is to be attended by the adolescent with SUDs and his/her family members because the primary focus of the sessions is on the relationships among family members. The practitioner's role is to interrupt problematic cycles, ineffective communication, and harmful behaviors family members currently use to meet their emotional and interpersonal needs. As change in family interaction can influence each family member's behavior, family members are encouraged to be part of the solution.

The overarching aim of the present study was to explore the potential of TF in reducing substance consumption and in improving family interaction among youth who use SUDs. The specific objectives were to evaluate if participating in TF would (1) lead to a reduction in adolescent's substance consumption, (2) be associated with a reduction in drug-related activities, (3) be associated with a decrease in mental health problems, and (4) lead to an improvement in family interaction.

Based on findings of numerous studies, the following hypotheses were tested: Participating in TF was hypothesised to be associated with a reduction substance consumption, involvement in drug-related activities, mental health problems, as well as in improving family functioning.

2. Method

2.1. Research design

A mixed-method design was employed, using both quantitative and qualitative research methods to address the research aim. Both quantitative and qualitative approach in succession offers a more comprehensive way to explore and confirm the hypothesis than when only one approach is used. We also used a pre-post-intervention and follow-up research design to determine the extent to which TF has a potential to deliver positive results (i.e., reducing substance consumption, drug-related activities, mental health problems, as well as in improving family) and prove to be "evidence-based". The same set of questionnaires was used before and after the intervention and at a follow-up period to measure the main dependent variables which were hypothesized to be changed through participation in the TF. It is generally assumed that if the post- and follow-up scores have changed positively from the pre-intervention scores, then the change is due to the treatment (Fraenkel & Wallen, 2009).

To strengthen the data analysis, the interview data were triangulated with the quantative data. This triangulation means that the information about adolescent's mental health difficulties (measured using "Strengths and Difficulties Questionnaire") and perception of family functioning (assessed using "Family Assessment Device") were collected from adolescents and their parent/family member. Interviews were conducted with adolescents and also their families.

2.2. Participants: Adolescents and their families

Forty-two adolescents and their family member(s) were randomly selected from five community centers. These adolescents visited one of these centres because they had problems with substance use which caused impairments in one or more of these life domains: social, educational, and psychological. The adolescents had been referred to one of these centers mostly by their school or by a local social services department. Two of these community centers are in North Jakarta and three centers were located in East Jakarta; North and East Jakarta were chosen because these two regions have been reported to have a high prevalence of youth substance use compared to other regions in Jakarta (BNN, 2019).

One adolescent had a relapse and needed an inpatient intervention, and another adolescent had to move to another city to take up an internship offered. Ten adolescents discontinued the sessions. Eleven adolescents could not be contacted following the lockdown imposed by the Indonesian government to contain the spread of COVID-19. Thus, only data of 19 adolescents and their families who completed the questionnaires at pre-, post-intervention as well as at one month-follow-up assessment were used in the analyses.

Adolescents in the dropout group were significantly older than those in the non-dropout group (Table 1). There were no group differences in the other sociodemographic characteristics. In both groups, there were more males than females; however, the number of males and females among those in the dropout and non-dropout groups was equally distributed. Slightly more than half of the adolescents live with both parents, and most of them are still attending school. Among adolescents who were no longer going to school, 60% of those in the non-dropout group were unemployed compared to 33.3% of those in the dropout group.

There were no significant differences in any of the sociodemographic characteristics of a family member who accompanied the adolescent to the session and who completed the questionnaires. In both the dropout and non-dropout groups, the informants were mostly female. Approximately half (57.9%) of those in the dropout group earned below Rp 3 million (approximately below 200 USD), whereas about half (52.6%) of those in the non-dropout group earned between Rp 6 – 10 million (approximately 400–700 USD).

Table 1

Adolescent – Sociodemographic characteristics.

Variables	Dropout (N = 22)[*] N (%)	Non-dropout (N = 19) N (%)	F-value or χ^2
Sex			
– Male	20 (90.9)	16 (84.2)	χ^2 =
– Female	2 (9.1)	3 (15.8)	0.43, ns
Age (in years)[**]: Mean (SD)	17.41 (1.9)	16.05 (1.0)	F = 8.10[**]
Living arrangement:			
– with both parents	12 (54.5)	12 (63.2)	χ^2 =
– with mother only	2 (9.1)	2 (10.5)	1.07, ns
– with father only	3 (13.6)	3 (15.8)	
– with other people	5 (22.7)	2 (10.5)	
Number of people living in the household, mean (SD)	5.0 (2.7)	4.74 (1.9)	F = 0.71, ns
Still going to school			
– No	6 (27.3)	6 (31.6)	χ^2 =
– Yes	16 (72.7)	13 (68.4)	0.09, ns
Current activity, if not in school:			
– unemployed	2 (33.3)	3 (60.0)	
– help family work/business	1 (16.7)	1 (20.0)	
– labourer/grab diver	3 (50.0)	1 (20.0)	χ^2 = 4.14, ns
Number of friends			
– No friend	2 (9.1)	–	
– 2 – 3 friends	3 (13.6)	–	χ^2 =
– More than 4 friends	17 (77.3)	19 (100)	4.92, ns
Frequency of meeting friends (per week)			
– less than once	3 (13.6)	–	
– 1 – 2 times	5 (22.7)	4 (21.1)	χ^2 =
– 3 + times	14 (63.6)	15 (78.9)	7.51, ns

[*] One participant has missing sociodemographic information.

[**] ranging from 15 to 21 years.

2.3. Measures

The adolescents and their parents/family members were asked to complete a set of questionnaires before and after the intervention, and at a follow-up period (i.e., approximately one month after completing the intervention).

2.3.1. Questionnaires for the adolescents

The adolescents completed five questionnaires to measure substance consumption, life events, having friends who are involved in risk-taking and anti-social behaviours, as well as substance use psychological wellbeing, and family functioning. These questionnaires were selected because they are amongst the most widely used scales to measure the above constructs due to their reliability and validity.

Social and Health Assessment (SAHA; Ruchkin, Schwab-Stone, & Vermeiren, 2004) was used to measure the adolescent's friends who participate in various types of risk-taking and anti-social behaviours, as well as substance use. The 9 items are rated on a 4-Likert scale, ranging from "none of them" (1) to "most or all of them" (4). These items include: Had fights or arguments with other people while you were drinking alcohol; Had fights or arguments with other people related to your use of drugs; Been drunk or very high from drinking alcoholic beverages; Been high from taking drugs; Been unable to stop using drugs

or alcohol when you wanted to; Ridden in a car or other vehicle driven by someone who had been drinking alcohol or using drugs; Felt very uncomfortable or sick when you were not taking drugs; Been expelled from school because of drug use/ possession; Had money problems because of your spending on drugs; Engaged in illegal activities in order to obtain drugs; Had been arrested for drugs.

The Substance Consumption scale of the SAHA (SCS; Ruchkin et al., 2004) was used to measure the frequency and amount of substances that the adolescents had consumed in their lifetime and in the past 30 days: alcohol, drugs (e.g., marijuana, amphetamines, other drugs), and tobacco.

Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) was used to measure positive and negative attributes. Its 25 items can be divided into the following subscales: emotional symptoms, conduct problems, hyperactivity, peer problems and prosocial behaviours. Each item can be rated on a 3-point Likert scale, ranging from 0 (not true) to 2 (certainly true).

Family Assessment Device (FAD; Epstein, Baldwin, & Bishop, 1983) was used to measure effective family functioning, from the adolescent's perspective. The FAD utilises a 4-point Likert scale, ranging from "strongly agree" to "strongly disagree." The items can be added up to get the total score, with higher scores indicate more problematic functioning.

Sociodemographic scale was used to measure basic sociodemographic information (e.g., age, gender, living arrangement), number of close friends, and experience of life events in the last 12 months.

2.3.2. Questionnaires for the parent/family member

Family Assessment Device (FAD; Epstein et al., 1983) was used to measure effective family functioning, from the parent's/family member's perspective. The FAD utilises a 4-point Likert scale, ranging from "strongly agree" to "strongly disagree", with higher scores indicate more problematic functioning.

Parent version of the Strengths and Difficulties Questionnaire (SDQ-P; Goodman, 2001) was used to measure parent's perspective of the adolescent's positive and negative attributes. Its 25 items can be divided into the following subscales: emotional symptoms, conduct problems, hyperactivity, peer problems and prosocial behaviour. Each item can be rated on a 3-point Likert scale, ranging from 0 (not true) to 2 (certainly true).

Sociodemographic scale was being used to measure basic sociodemographic information (e.g., age, gender, employment status, living arrangement), number of people in the household, and experience of life events in the last month.

2.4. Interview

Both the adolescents and their parent or a family member were separately interviewed about their experience with TF at the end of the intervention. The topic guide focused on eliciting the perspectives of adolescents and parents about the TF skills they find the most useful. All interviews were voice recorded, transcribed verbatim, and analysed offline.

3. Results

3.1. Substance consumption

Results showed a significant reduction in alcohol consumption from Pre-TF to Follow-up ($\chi 2$ (3) = 11.471, $p < .01$). The number of days in which the adolescents had five or more drinks of alcohol in a row did show some reductions, however, these changes did not reach any significant levels. The number of adolescents who smoked cigarettes, consumed marijuana and amphetamines also decreased across time, but these reductions were not significant.

3.2. Involvement in alcohol- and drug-related activities

A one-way repeated measure analysis (ANOVA) was conducted to evaluate adolescent's total alcohol- and drug-related activities in the past 30 days at pre-, and post-TF and at a one-month follow-up assessment period. There was a general trend of reduction in adolescent's alcohol- and drug-related activities, however, this decrease did not reach any significant level, Wilks' Lambda = 0.74, $F(2, 15) = 2.59$, $p = .11$.

Separate analyses were also conducted on each specific alcohol- and drug-related problems (Table 2). A Friedman's test showed that there was a significant difference on "Ridden in a car or other vehicle driven by someone who had been drinking alcohol or using drugs" following the intervention, $\chi^2(2) = 6.50$, $p = 0.04$.

Fig. 1 shows the mean number of adolescent's friends who consumed substances and participated in antisocial behaviours as measured using the SAHA. The results of the ANOVA indicated a significant time effect for the SAHA scores, Wilks' Lambda = 0.50, $F(2, 13) = 6.42$, $p = .01$. Follow-up comparisons indicated that a pairwise difference between pre-TF and at follow-up, and between post-TF and at follow-up were significant, $p < .05$. These findings suggested that the number of these friends decreased significantly after the adolescent received the intervention which was maintained up to follow-up period.

A series of one-way repeated measure analysis (ANOVA) was conducted to evaluate whether participating in TF led to reduction in adolescent's involvement with friends who were engaged in specific antisocial behaviours (Table 3). The results of the ANOVA indicated a significant time effect for friend(s) who: (a) skipped school a lot without permission (Wilks' Lambda = 0.55, $F(2, 14) = 5.72$, $p = .02$.); (b) drink alcohol/miras fairly regularly (Wilks' Lambda = 0.59, $F(2, 14) = 4.83$, $p = .03$); and (c) have been violent (Wilks' Lambda = 0.55, $F(2, 14) = 5.73$, $p = .02$). For all these three activities, follow-up comparisons indicated that a pairwise difference between post-TF and at follow-up were significant, $p < .05$.

Table 2
Mean rank of each specific alcohol- and drug-related problems during the last 30 days.

	Pre-TF	Post-TF	Follow-up	χ2
1) Had fights or arguments with other people while you were drinking alcohol.	2.21	1.85	1.94	5.20, ns
2) Had fights or arguments with other people related to your use of drugs	2.06	1.97	1.97	2.00, ns
3) Been drunk or very high from drinking alcoholic beverages	2.12	1.94	1.94	4.00, ns
4) Been high from taking drugs	1.97	2.06	1.97	2.00, ns
5) Been unable to stop using drugs or alcohol when you wanted to	2.06	2.06	1.88	2.00, ns
6) Ridden in a car or other vehicle driven by someone who had been drinking alcohol or using drugs	2.21	1.94	1.85	6.50*
7) Felt very uncomfortable or sick when you were not taking drugs	2.09	2.00	1.91	2.00, ns
8) Been expelled from school because of drug use/possession	–	–	–	–
9) Had money problems because of your spending on drugs	2.12	1.94	1.94	4.00, ns
10) Engaged in illegal activities in order to obtain drugs	–	–	–	–
11) Had been arrested for drugs	2.06	1.97	1.97	2.00, ns

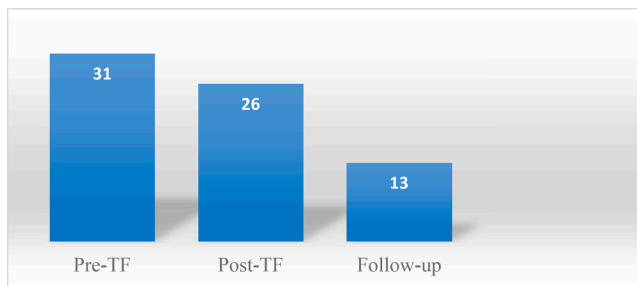ns = No significant (p > .05).
* = p < .01.

Fig. 1. Mean number of friends who consumed substance and participated in antisocial behaviour. Note: TF = Treatnet Family.

Table 3
Number of friends who consumed specific substance and participated in specific antisocial behaviour.

	Pre-TF Mean (SD)	Post-TF Mean (SD)	Follow-up Mean (SD)	F-value
Friends who.....				
1) Smoke cigarettes on a pretty regular basis	7.62 (6.1)	6.50 (4.9)	5.06 (5.1)	3.19, ns
2) Dropped out of school before finishing high school	2.71 (3.3)	1.71 (1.9)	1.59 (1.7)	1.26, ns
3) Skipped school a lot without permission	2.13 (1.7)	2.31 (1.8)	1.31 (1.7)	5.77*
4) Go out in the evening without their parents' permission	3.38 (3.6)	3.31 (4.3)	1.69 (2.8)	2.75, ns
5) Drink alcohol/miras fairly regularly	2.38 (4.5)	1.25 (1.2)	0.38 (1.3)	4.83*
6) Use benzodiazepine/boti, marijuana/gele, sinte, amphetamine/shabu, opioid/ tramadol, any other drug?	2.00 (3.1)	1.00 (2.1)	0.44 (1.3)	2.93, ns
7) Have had sexual intercourse	0.13 (0.50)	0.37 (1.2)	0.13 (0.5)	0.26, ns
8) Have sex in exchange for money or drug	0.63 (2.5)	0.00 (0)	0.00 (0)	1.00, ns
9) Have been at the juvenile court because of their behaviour	0.81 (2.4)	0.00 (0)	0.13 (0.5)	1.45, ns
10) Have been violent (e.g., been in fights)	2.13 (2.8)	1.81 (1.9)	0.94 (1.7)	5.73*
11) Have been arrested by the police	2.13 (4.7)	2.50 (4.7)	0.19 (0.5)	2.09, ns
12) Have been abandoned by their family	1.06 (3.0)	0.56 (1.5)	0.19 (0.4)	0.89, ns
13) Have been stealing	0.75 (1.0)	0.75 (1.2)	0.31 (0.7)	1.76, ns
14) Have been in contact with gang or violent group	2.69 (5.0)	3.88 (9.2)	0.50 (1.3)	1.44, ns

ns = No significant (p > .05).
* = p < .01.

3.3. Impact of TF on adolescent's mental health difficulties

The impact of TF on adolescent's mental health difficulties (as measured using the SDQ) showed some interesting findings in showing discrepancies between self-report (by the adolescents) and a report from family members. Based on adolescent self-report, the total mental health difficulties decreased at post-TF and at follow-up, however, this decrease did not reach any significance level. Specifically, a one-way repeated measure analysis (ANOVA) was conducted to evaluate whether or not there was a change in adolescent's mental health problems across time. The results did not find a significant time effect, Wilks' Lambda = 0.68, F (2, 16) = 3.38, p = .06.

However, based on parent's/family member's report, a significant change in adolescent's mental health problems was found. Specifically, ANOVA indicated a significant time effect for the total SDQ scores,

Wilks' Lambda = 0.57, F(2, 16) = 6.08, p = .01. Follow-up comparisons indicated that a pairwise difference between pre-TF and at follow-up was significant, $p < .05$. There was a significant decrease in mental health problems from pre-TF and at follow-up (Table 4).

3.4. Life events and family functioning

Two most common life events reported by the adolescents were "Got in a lot of arguments or fights" and "Had problems with drugs or alcohol". A one-way repeated measure analysis (ANOVA) indicated a significant time effect for the total life events experienced by the adolescents, Wilks' Lambda = 0.501, F(2, 15) = 7.47, p = .01. Follow-up comparisons indicated that a pairwise difference between pre-TF and at follow-up was significant, $p < .05$. There was a significant decrease in the mean number of life events across time. When analysing the specific type of life events, a significant time effect was found for "Got in a lot of arguments or fights", Wilks' Lambda = 0.622, F(2, 15) = 4.56, p = .02. Significant time effect was also found for "Had problems with drugs or alcohol", Wilks' Lambda = 0.647, F(2, 15) = 4.09, p = .03. For these two life events, follow-up comparisons indicated that a pairwise difference between pre-TF and at follow-up was significant, $p < .05$, indicating that there was a significant decrease in life events from pre-TF to follow-up. Data of the family member showed no significant time effect for life events.

On family functioning (total scores), our results showed some trends for improvement as reported by the adolescents (Wilks' Lambda = 0.86, F (2, 16) = 1.19, p = .33) and a family member (Wilks' Lambda = 0.96, F(2, 16) = 0.27, p = .77), however, these changes did not reach a significant level.

3.5. Interview with the adolescents and their family members

3.5.1. Interview with the adolescents
The skills that the adolescents reported as most useful were communication and listening skills, interpersonal skill, and self-regulation skills. These skills facilitated positive interactions with their parents and friends. Furthermore, having learnt about the detrimental effects of drugs helped them to have negative attitudes toward drugs and to distant themselves from peers who consumed drugs. Instead, they diverted their energy to studying, exercising, and interacting with new peer groups who did not consume substances.

> "I am now able to adopt the activities and skills that I have learnt in TF into my daily lives at home. These skills also helped me to build new positive personal habits such as no longer hanging out at late at night or skipping school and get involved with deviant peer groups".

3.5.2. Interview with a family member
The parents observed some positive changes in the adolescents such as spending more time with them, being more compliant with them, had better communication (e.g., asking permission from their parents before going somewhere), helpful with chores, studied harder, showed changes in their sleeping pattern, and changes in late-night hang out habits. Throughout the TF sessions, they reported having a closer relationship with their children.

The most important skills and knowledge gained from TF included communication and parenting skills, which they used to: (a) build conversation with their children at home: *"talked about how the day was, feelings, and concerns"*; (b) create time for shared activities that *"we frequently do chores together, have family dinner, or watch TV together"*; and (c) agree on house rules *"agreeing on studying time, free time to hang out with friends, curfew and time to sleep"*.

Table 4
Adolescent's mental health difficulties (using SDQ) as reported by a family member.

SDQ subscales	Pre-Intervention Mean (SD)	Post-Intervention Mean (SD)	Follow-up assessment Mean (SD)	Wilks' Lambda	F	Post-hoc comparison (p < 0.05)
Emotional symptoms	3.72 (2.74)	4.17 (2.62)	2.17 (1.86)	0.59	5.66*	T1 > T3 T2 > T3
Conduct problems	2.50 (1.42)	1.56 (1.62)	1.50 (1.29)	0.65	4.24*	T1 > T2
Hyperactivity	2.78 (1.86)	2.00 (2.06)	1.50 (1.29)	0.69	3.64*	T1 > T3
Peer problems	2.22 (1.92	2.06 (1.51)	1.50 (1.29)	0.82	1.00	
Total SDQ score	11.22 (5.67)	9.78 (5.52)	6.61 (3.66)	0.57	6.08**	T1 > T3

4. Discussion

The present study was the first to have examined the benefit of TF in reducing substance use and substance-related activities among adolescents in low- and middle-income countries, when delivered by practitioners in routine community settings. A major strength of our study was its use of a mixed-methods design and triangulation of data which enabled voices of the adolescents and their parents about their experience with TF to be captured. As argued by Bryman (2012), triangulation of data provides a greater credibility of the findings.

In line with previous studies that used family-based therapy (Spoth et al., 1998; 2004; 2015), our findings showed a significant reduction in alcohol consumption from pre-TF to follow-up assessment period. Our finding also showed a reduction in the number of adolescents who smoked cigarettes, consumed marijuana and amphetamines decreased across time although these reductions did not reach any significant levels. This finding could be interpreted as replicating the finding reported by Horigian et al. (2015) where no significant difference was found in median drug use days between adolescents who participated in the Brief Strategic Family Therapy and treatment as usual. Future studies are needed to determine the way in which TF can be better implemented to maximize positive outcomes among young people with drug use problems.

Our findings showed that participating in TF significantly reduced adolescent's involvement in alcohol- and drug-related activities. Specifically, there was a significant difference on "Ridden in a car or other vehicle driven by someone who had been drinking alcohol or using drugs" following the intervention. This is an important result because about one quarter of the adolescents who were involved in fatal car crashes had been drinking (National Highway Traffic Safety Administration, 2014), and that peer influence has an important impact on drinking alcohol and driving (Evans-Whipp, Plenty, Toumbourou, Olsson, Rowland, & Hemphill, 2013), riding with a drinking driver (Chen, Grube, Nygaard, & Miller, 2008; Li, Simons-Morton, Brooks-Russell, Ehsni, & Hingson, 2014), and risk of motor vehicle crashes (Simons-Morton, Ouimet, Zhang, Klauer, Lee, Wang et al., 2011). Our findings could be interpreted as supporting a recent study by Haegerich, Shults, Oman, and Vesely (2016) which showed parental monitoring as the most important and consistent factor that predicted drinking alcohol and driving and riding with a drinking driver over time.

Following the intervention, adolescents reported in engaging with fewer friends who consumed substances (drink alcohol/miras) and participated in antisocial behaviours (i.e., friends who skipped school a lot without permission; and have been violent) than before the intervention; this positive change was maintained during the follow-up assessment period. These quantitative findings (through questionnaires) were supported by the qualitative data (through interview). Interviews with the adolescents and their parent/family member provided information that could be used to explain for this positive outcome. As described by the adolescents, the communication and listening skills, interpersonal skill, and self-regulation skills that they learned during the TF were beneficial in their interaction with their friends. As adolescents are particularly susceptible to peer influence at this developmental stage, these skills are useful for adoescents to overcome peer pressure (Ali & Dwyer, 2010). Furthermore, having learnt about detrimental effects of drugs helped them

to have negative attitudes toward drugs and to distant themselves from peers who consumed drugs. It is therefore not surprising that the two most reported life events at baseline ("Got in a lot of arguments or fights" and "Had problems with drugs or alcohol") were significantly reduced across time.

Studies have consistently reported the comorbidity between substance-use problems and emotional and behavioural problems (Essau & Delfabbro, 2020). It is therefore helpful to find out that adolescent's mental health difficulties were significantly reduced across time as reported by the parent/family member. While reduction on mental health difficulties was found based on adolescent's self-report, this decrease did not reach any significance level. The reason for this discrepancy between the adolescent and the parent report was not clear. Disagreement between parent and child/adolecsent informants on the presence and severity of mental health difficulties especially among emotional problems is widely known (De Los Reyes & Kazdin, 2005). However, the discrepancy differs across ethnicity. As shown by Lau, Garland, Yeh, McCabe, Wood, & Hough (2004), European and American parents reported more emotional problems than their children, while African-American, Hispanic-American, and Asian/Pacific Islander children in the US reported more emotional problems than their parents.

An intriguing finding was related to the family functioning. While our quantitative data (as measured using the Family Assessment Device) showed no significant improvement in family functioning, interview data with the adolescents and their parent/family member suggested significant improvement was achieved. According to the parent, this improvement was the result of the newly learned communication and parenting skills, which they used to build conversations with their children at home, create time for shared activities, and to agree on house rules. The reason for the discrepancies between questionnaire and interview data family functioning were unclear and may reflect differences in interpreting the way in which the questions were understood. Speculatively, as the questionnaire (i.e., Family Assessment Device) that was used to measure family function was developed within the Western context, the items might not be sensitive to the Indonesian sociocultural milieu. For example, in traditional Indonesian family, it is usually the parents that plan family activities without any active involvement of the children. Furthermore, other studies (Place, Barker, & Reynolds, 2007) have similarly reported that self-report questionnaires to measure family functioning (e.g., Family Adaptability and Cohesion Questionnaire) do not seem to be a sensitive method to measure changes in the family's dynamic interaction within the short to medium-term following the intervention.

There are several methodological limitations to this study, which need to be taken into consideration when interpreting our results. First, this was an open trial with a short follow-up period (i.e., one month after the end of the intervention). Second, the adolescents were included in the study as they have been referred to the participating community setting. As it is common in routine community setting, we did not undertake any diagnostic interviews to establish whether or not the adolescents meet the diagnosis of a substance use disorders due to lack of human resources to conduct a diagnostic interview. We relied on standard practice and on adolescent- and parent-completed self-report measures to measure the presence of substance-use problems. Third, we

had a small sample size and almost all of them were males. Fourth, the drop-our rate was high. Due to the movement restriction to contain the spread of COVID-19 in early 2020, the number of participants who could not be contacted at the follow-up assessment was much higher than expected.

To conclude, our findings suggest that TF has benefitted in reducing substance consumption and mental health difficulties among adolescents with substance-use problems.

5. Author agreement

All authors have seen and approved the final version of this manuscript. We confirm that the article is our original work, has not received prior publication and is not under consideration for publication elsewhere.

CRediT authorship contribution statement

Anja Busse: Conceptualization, Validation, Writing - original draft, Writing - review & editing, Supervision, Funding acquisition. **Wataru Kashino:** Conceptualization, Writing - review & editing, Supervision, Funding acquisition. **Sanita Suhartono:** Conceptualization, Writing - review & editing. **Narendra Narotama:** . **Dicky Pelupessy:** Data curation, Formal analysis, Writing - review & editing. **Irwanto:** Data curation, Formal analysis, Writing - review & editing. **Cecilia A. Essau:** Conceptualization, Methodology, Data curation, Formal analysis, Writing - original draft, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no conflict of interest.

Anja Busse, Wataru Kashino, Sanita Suhartono and Narendra Naratoma are staff members of the United Nations. The views and opinions expressed therein are those of the authors and do not necessarily reflect those of the United Nations.

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