The prediction of alexithymia as a state or trait characteristic in patients with substance use disorders and PTSD

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ABSTRACT

Alexithymia is common in patients with a substance use disorder (SUD) and is possibly a negative prognostic factor in their treatment. The aim of this study was twofold. First, we explored whether SUD patients with posttraumatic stress disorder (PTSD) are more alexithymic than SUD patients without PTSD. Next, we explored whether trait and state-related parts of alexithymia could be differentiated in these patients. This phenomenon was studied in 197 SUD patients with the Toronto Alexithymia Scale-20 (TAS-20); Clinician Administered PTSD Scale; Self-Report Inventory for PTSD; Traumatic Experiences Checklist; European Addiction Severity Index; and the Depression, Anxiety and Stress Scale in a cross-sectional design. SUD patients with current PTSD showed more alexithymic characteristics than patients without PTSD or with previous lifetime/not current PTSD. The severity of PTSD complaints; alcohol addiction; and the combination of depression, anxiety and stress symptoms, all of which are more related to alexithymia as a state, explained 38.1% of the TAS-20. In conclusion, we advise that SUD patients be assessed for alexithymia and that its degree is taken into account. We also tentatively assume that a considerable part of alexithymia is more state- than trait-related in these patients.

1. Introduction

Alexithymia is a psychological construct that literally means 'no words for emotions' (Sifneos, 1973). Persons with alexithymia have difficulties recognizing, naming and regulating their own (or others') emotions; an inability to discriminate between feelings and physical sensations; a limited fantasy life; and a mainly externally oriented way of thinking (Sifneos, 1973; Taylor et al., 1997).

The prevalence of alexithymia in the general population is from 5% to 15% (den Hollander et al., 1991; Franz et al., 2008; Salminen et al., 1999; Samur et al., 2013). Alexithymia shows high prevalence in several psychiatric disorders, such as depressive disorders (Leweke et al., 2012), posttraumatic stress disorder (PTSD) (Becirovic et al., 2017; Eichhorn et al., 2014; Frewen et al., 2006) and substance use disorders (SUDs) (Cruise and Beccera, 2018; Thorberg et al., 2009). A recent review paper (Cruise and Beccera, 2018) showed prevalence rates of 30%–49% in patients with an alcohol use disorder (AUD). In patients with multiple or opioid SUDs (El Rasheed, 2001; Oyefeso et al., 2008), prevalence rates of 46%–76% were found.

Not only alexithymia but also PTSD is frequent in SUD patients. Previous research has shown that prevalence rates of cooccurring PTSD in SUD patients are high, varying from 8% in an outpatient environment to 59% in an inpatient environment (Evren et al., 2010; Gielen et al., 2012; Kok et al., 2013; Najavits et al., 1998). Prevalence rates of alexithymia of 11% were found in the German general population with PTSD symptoms without SUD (Eichhorn et al., 2014), and rates of 75% or 78% were found in war veterans with PTSD (Becirovic et al., 2017). Evren et al. showed a prevalence of alexithymia of 46% in AUD patients with lifetime cooccurring PTSD (Evren et al., 2010). To our knowledge, no other publications exist on the prevalence of alexithymia in SUD populations with cooccurring PTSD. To differentiate between alexithymia and PTSD, it is important to note that PTSD and alexithymia overlap with each other with respect to the symptom of the numbing of emotions (Badura, 2003; Eichhorn et al., 2014). A discussion of whether alexithymia could be an integral part of PTSD or an independent concept is currently ongoing (Eichhorn et al., 2014).

Alexithymia can be characterized as a 'trait' or as a 'state' (Freyberger, 1977). Alexithymia as a trait is a personality characteristic (Taylor et al., 1997) with no absolute stability but moderate to high relative stability and is presumed to be life-time (de Haan et al., 2014; de Timary et al., 2008; Haviland et al., 1988; Messina et al., 2014). As a trait, alexithymia is supposed to derive from neurobiological factors, such as brain pathology (Valdespino et al., 2017), genetic factors

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(Jørgensen et al., 2007) or a disturbance in emotion regulation skills in early youth mostly as a result of traumatic experiences (Bermond, 1995; Jørgensen et al., 2007; Kano et al., 2012; Messina et al., 2014; Meza-Concha et al., 2017; Thorberg et al., 2009). Alexithymia as a state characteristic has been interpreted as a coping reaction to a stressor, such as a somatic disease, or it has been related to other state conditions, such as SUD, depression or PTSD (Freyberger, 1977; Fukunishi et al., 1997; Messina et al., 2014). As a state alexithymia may be present for a much shorter time and could potentially be resolved after treatment or if the stressor is no longer existing (Cruise and Beccera, 2018; Messina et al., 2014).

The clinical presentation of alexithymia could be a combination of trait and state characteristics. Moreover, it could manifest itself as a state and more pronounced in a setting of life stressors and acute psychiatric illness, especially in persons or patients, who have a predisposition to alexithymia as a trait characteristic (Lumley et al., 2007).

In SUD patients, alexithymia has been found to have both trait and state characteristics (de Haan et al., 2014; de Timary et al., 2008). Currently, there is still a debate as to whether or how the distinction between alexithymia as a trait or state can be made (Cruise and Beccera, 2018; de Haan et al., 2012a). This is of clinical importance because alexithymia as a state characteristic could be temporary and probably relatively easy to change.

Alexithymia has been shown to be a negative prognostic factor in many psychological treatments (Lumley et al., 2007; Ogrodniczuk et al., 2011; Shands, 1977). Research on the effect of treatment of alexithymia is scarce (Beresnevaité, 2000). However, some studies have found that SUD patients with alexithymia can benefit from highly structured cognitive-behavioral treatment programs (Cleland et al., 2005; De Haan et al., 2012b; Lumley et al., 2007; Rosenblum et al., 2005). To our knowledge, there are no studies that assess the influence of alexithymia outcomes in treatments of PTSD or SUD patients with cooccurring PTSD.

Because of the high prevalence of alexithymia and the negative influence that this condition can have on treatment outcome, it is important to take alexithymia into account in the treatment of SUD patients. In addition, knowing whether the alexithymia has more trait or state-related characteristics at the start of the treatment could be helpful in formulating treatment goals regarding alexithymia and for identifying how to address the alexithymic characteristics during treatment. Trait alexithymia will not diminish, according to our expectations, if alexithymia is not the focus of treatment. Alexithymia as a state is supposed to decrease or disappear if the SUD or comorbid psychiatric disorder such as depression is successfully treated (Honkalampi et al., 2010; Stasiewicz et al., 2012). For reasons of psycho-education for both the patients and their families and for choosing treatment interventions, it could be of value to know if the alexithymia is temporary or not (Honkalampi et al., 2010; Preece et al., 2017; Samur et al., 2013; Stasiewicz et al., 2012).

The aim of this study was twofold. First, we aimed to explore the prevalence and degree of alexithymia in SUD patients with and without cooccurring PTSD. Second, we aimed to study whether the degree of alexithymia can be related to patient variables that are theoretically distinguished as more trait- or state-like characteristics.

2. Methods

2.1. Design

This study was an observational study with a cross-sectional design.

2.2. Participants

Participants were inpatients of four Dutch addiction treatment centers. All patients met the DSM-IV criteria for at least one SUD (Table 2). Four weeks of abstinence were required of the participating patients to avoid the influence of withdrawal symptoms. Of the 263 eligible patients, 202 patients were willing to participate in the study, and 5 patients did not complete all the interviews; therefore 197 patients were included.

2.3. Procedure

The data collection of this study ran from March 2008 until May 2011 as part of a PhD project on the relationship between SUD and PTSD (Kok, 2017). It was approved by the local medical ethics committee (METC/11270.haa) (Kok, 2017). All research assistants had a bachelor's or master's degree in psychology. Written informed consent was obtained.

2.4. Instruments

2.4.1. Toronto Alexithymia Scale-20 (TAS-20)

Alexithymia was assessed with the self-report Dutch version of the Toronto Alexithymia Scale-20 (TAS-20). The TAS-20 is the most frequently used assessment instrument for alexithymia. It consists of 20 items and measures three subscales: 1) difficulty identifying feelings, 2) difficulty describing feelings, and 3) externally oriented thinking (Bagby et al., 1994; Kooiman et al., 2002). Each item consists of a five-point Likert scale that ranges from 'completely disagree' to 'completely agree'. The Dutch total TAS-20 showed good internal consistency in student and outpatient psychiatric populations, with Cronbach's alpha varying between 0.79 and 0.82 (Kooiman et al., 2002).

2.4.2. The Clinician Administered PTSD scale (CAPS)

Hovens, Luinge and van Minnen (Hovens et al., 2005) translated the Clinician Administered PTSD Scale (CAPS) (Blake et al., 1995) into Dutch. It is the most widely used structured interview for the diagnosis and determination of the severity of PTSD. Both the original and the Dutch CAPS have strong psychometric properties. The interrater reliability of the Dutch translation is between 0.92 and 1.00 (Cohen's Kappa), and the internal consistency is 0.89 (Hovens et al., 1994; Weathers et al., 2001). The clinical interview assesses experienced traumatic events and the 17 symptoms of PTSD according to the DSM-IV. Each symptom is rated on a 5-point scale for frequency of the symptoms' presence and intensity.

2.4.3. The Self-Report Inventory for PTSD (SRIP)

The Self-Report Inventory for PTSD (SRIP) is a Dutch self-report questionnaire of PTSD symptoms (Hovens et al., 2002). The 22 items are scored on a 4-point Likert scale that ranges from 1 'not at all' to 4 'often' and indicate the intensity of the PTSD symptoms in the past month. The SRIP uses the three subscales described in the DSM-IV criteria: 'intrusion', 'avoidance' and 'hyperarousal'. The internal consistency is 0.92 (Hovens et al., 2002). The SRIP had good psychometric qualities in a study of Dutch SUD patients (Kok et al., 2013), a sensitivity for PTSD of 0.80 and a specificity of 0.73.

2.4.4. Traumatic Experiences Checklist

The Traumatic Experiences Checklist (TEC) is a self-report questionnaire developed in the Netherlands to collect information about traumatic experiences. The TEC has been validated in a sample of 153 psychiatric outpatients, including satisfactory internal consistency, test-retest reliability and criterion validity (Nijenhuis et al., 2002). When the answer on a description of a traumatic experience is 'yes', additional questions are asked: the age when the traumatic experience happened and the degree of psychological stress that the experience caused (Likert scale that ranges from 1 'not at all' to 5 'extremely traumatized'). The total score is the number of traumatic experiences in the life of the patient (range from 0 to 29), and separate counts can be obtained for emotional, physical and sexual traumas. The age of the first traumatic experience is also documented in the TEC (Nijenhuis et al., 1995) by the

Table 1
ANOVA on mean scores of alexithymia in patients with substance use disorder (SUD).

	Without PTSD Mean (SD) (n)	Lifetime/not current PTSD Mean (SD) (n)	Current PTSD Mean (SD) (n)	*F*	*p*	Post hoc (Tukey)
TAS-20 (SD) (N)	55.0(12.2)(88)	53.6(13.3)(50)	63.9(11.8)(49)	10.61	0.000	3 ≥ 1,2

Note: TAS-20 = Toronto Alexithymia Scale.

earliest trauma, with a score of at least 3 on the 1–5 scale.

2.4.5. The European version of the addiction severity index

The European version of the Addiction Severity Index (EuropASI) is the European version of the fifth edition of the Addiction Severity Index (McLellan et al., 1992). It assesses problem severity in 7 domains of functioning that are commonly affected by SUD: psychical health, employment, alcohol and/or drug abuse, legal, familial, social and psychiatric (Blanken et al., 1994). Severity scores can range from 0 (no problem) to 9 (an extremely serious problem). The internal consistency of the 7 subscales varied from moderate (employment) to good (alcohol use) (Hendriks et al., 1990).

For the current study, only the domains of alcohol and/or drug abuse were used.

2.4.6. Depression, Anxiety and Stress Scale

The Depression, Anxiety and Stress Scale (DASS-21-R) is a 21-item self-report questionnaire designed to measure the severity of depression, anxiety and stress symptoms. It was derived from the original 42 item DASS (Lovibond and Lovibond, 1995b). Each subscale consists of 7 items that are scored from 0 'did not apply to me at all' to 3 'applied to me very much or most of the time'. The item scores are summed and then multiplied by 2 to obtain total scores that can be compared with the original DASS-42 (Lovibond and Lovibond, 1995).

The Dutch version of the DASS has been validated in an occupational health setting, showing high internal consistency (Nieuwenhuijsen et al., 2003). It has also been validated in a population of students and psychiatric patients in which support was found for convergent and divergent validity (de Beurs et al., 2001).

2.5. Statistical analysis

Descriptive statistics were used to describe the sociodemographic characteristics of the participants and to determine the prevalence and degree of alexithymia in SUD patients with and without PTSD. A *multiple linear regression model* was constructed to explore whether we could predict the total degree of alexithymia in SUD patients with variables more related to trait alexithymia and those more related to state-alexithymia.

The only available predictor variable most likely associated with alexithymia as a trait variable is the existence of interpersonal trauma before the age of 5 (Berenbaum, 1996; Messina et al., 2014; Wearden et al., 2003; Yates et al., 2012) (TEC).

Available predictor variables most likely associated with alexithymia as a state variable were addiction severity (EuropASI), presence of current PTSD (CAPS), severity of PTSD complaints (SRIP), severity of depression, and anxiety and stress complaints (DASS) (Eichhorn et al., 2014; Frewen et al., 2006; Freyberger, 1977; Krystal, 1979; Messina et al., 2014).

Potential confounders are 'level of education', 'gender', 'relationship' and 'nationality' (Lane et al., 1998).

Variables with a $p < 0.2$ in univariate correlational analyses were entered in the multiple linear regression model, because with this value it is most likely that all potentially predictive variables are included. Thereafter, to obtain a parsimonious model, nonsignificant variables were removed, one by one, until only significant predictors remained or the explained variance was reduced by >10%. The percentage of

>10% is chosen, because a change of more than 10% leads to a relevantly worse predictive accuracy, which is not balanced anymore by the advantages of constructing a smaller, more practical model.

3. Results

3.1. Prevalence and the degree of alexithymia in SUD patients without PTSD, with lifetime/not current PTSD and with current PTSD

The prevalence of alexithymia (TAS-20 > 60) in SUD patients with current PTSD (59.2%) was significantly higher than that in SUD patients without PTSD (34.1%) or lifetime/not current PTSD (32.0%), $X^2 = 11.238$, $p = 0.001$.

The ANOVA and post hoc analyses regarding the degree of alexithymia between these three groups are shown in Table 1.

3.2. Patient characteristics

The characteristics of patients with or without alexithymia did not differ in gender, age, education, relationships, country of birth or primary substance of abuse (see Table 2).

3.3. Prediction of state and trait alexithymia

See Table 3 for correlations between the independent variables and possible confounders and alexithymia. All variables in Table 3 were added to the multiple regression model.

Primarily, we entered all variables of Table 3 in our model. Secondly, we consecutively removed the variables 'Interpersonal trauma (< age of 5) Y/N (TEC)', 'Addiction severity drugs (EuropASI)', 'Presence of current PTSD (CAPS)' and 'Level of education' out of the model, as these variables did not contribute significantly to the model. In our final multiple regression model for predicting alexithymia, only the more state-related variables 'severity of PTSD symptoms' (SRIP), 'the severity of depression-, anxiety- and stress symptoms' (DASS total) and 'the severity of alcohol addiction' (EuropASI) explained a moderate proportion of the variance: 38.1%, see Table 4.

4. Discussion

In this study, we explored the prevalence and degree of alexithymia in SUD patients with cooccurring current PTSD in comparison with SUD patients without PTSD or lifetime/not current PTSD. We found, as expected, a higher prevalence and degree of alexithymia in SUD patients with current PTSD than in SUD patients without PTSD. However, we found no difference between SUD patients without PTSD and SUD patients with lifetime/not current PTSD. Furthermore, we explored whether alexithymia in SUD patients can be related to patient variables that are theoretically distinguished as more trait or state characteristics. Only three more state-related variables, the severity of PTSD, alcohol addiction, depression, anxiety and stress symptoms, explained a moderate proportion (38.1%) of alexithymia in SUD patients with or without cooccurring PTSD.

Evren et al. (2010) found a prevalence rate of alexithymia of 46.0% and a mean of the TAS-20 of 58.8 (SD = 8.9) in male alcohol-dependent inpatients with lifetime PTSD, which were higher than in their group without PTSD (prevalence: 22.6%; M TAS-20 = 53.5,

Table 2

Patient characteristics for patients with and without alexithymia.

Patient characteristics	No alexithymia TAS-20 ≤ 61	Alexithymia TAS-20 ≥ 60	X^2	F	df	p
Gender (N = 196			2.061		1	0.151
Men (N = 147)	57.8%	42.2%				
Women (N = 49)	69.4%	30.6%				
Age (M, SD)				0.965	195	0.117
Total	40.2 (12.74)	36.4 (12.02)				
Men	39.2 (13.2)	36.0 (11.7)				
Women	42.5 (11.0)	38.1 (13.7)				
Education (N = 193)			9.933		6	0.128
Primary school (N = 15)	5.2%	11.7%				
Secondary school (lower level) (N = 61)	31.9%	31.2%				
Secondary school (higher level) (N = 90)	43.9%	50.7%				
Postsecondary (N = 27)	18.9%	6.5%				
Relationship (N = 195)			1.145		4	0.887
Single (N = 123)	63.6%	62.3%				
Married/cohabiting (N = 37)	19.5%	18.2%				
Divorced/widowed (N = 35)	16.9%	19.5%				
Country of birth (N = 196)			2.218		2	0.330
Netherlands (N = 189)	97.5%	94.8%				
Other (N = 7)	2.5%	5.2%				
Primary substance of abuse (N = 192)			11.457		9	0.246
Alcohol (N = 89)	50.4%	40.0%				
Cocaine (N = 35)	17.1%	20.0%				
Cannabis (N = 20)	10.3%	10.7%				
Amphetamines (N = 8)	1.7%	8.0%				
Heroine (N = 6)	4.3%	1.3%				
Multiple substances (N = 25)	12.9%	13.4%				
Other (N = =9)	3.4%	6.6%				

Note: TAS-20 = Toronto Alexithymia Scale.

Table 3

Pearson's R correlations between r independent variables and possible confounders and alexithymia.

	Independent variables and confounder	R	p
Trait	Interpersonal trauma (<age of 5) Y/N (TEC)	−0.128	0.084
State	Addiction severity alcohol (EuropASI)	0.177*	0.022
	Addiction severity drugs (EuropASI)	0.137	0.143
	Severity of PTSD symptoms (SRIP)	0.539*	0.000
	Severity of depression, anxiety and stress symptoms (DASS)	0.528*	0.000
	Presence of current PTSD (CAPS)	0.254*	0.000
Confounder	Level of education	− 0.183*	0.011

Note: TEC = Traumatic Experiences Checklist, EuropASI = European version of the Addiction Severity Index, SRIP = Self-Report Inventory for PTSD, DASS = Depression, Anxiety and Stress Scale, CAPS = Clinician Administered PTSD Scale. Values with a p < 0.05 are considered significant and are indicated by a *.

Table 4

Multiple regression analysis predicting alexithymia.

	B	p	R^2	F	df	p
Alexithymia			0.381	32.462	3158	0.000
Constant	31.345					
Severity of PTSD symptoms (SRIP)	0.380	0.000				
Severity of depression, anxiety and stress symptoms (DASS)	0.109	0.006				
Addiction severity alcohol (EuropASI)	0.698	0.057				

Note: SRIP = Self-Report Inventory for PTSD, DASS = Depression, Anxiety and Stress Scale.

EuropASI = European version of the Addiction Severity Index. Nonsignificant variables were removed until R-squared changed by more than 10%.

SD = 10.2). The prevalence and degree of alexithymia in SUD patients with current PTSD in our study were higher than in alcohol-dependent patients with lifetime PTSD in the study of Evren et al. (2010). Our prevalence rate and degree of alexithymia in the lifetime/not current PTSD group were lower than those of the lifetime PTSD group in the Evren et al. (2010) study. The prevalence rate and degree of alexithymia in our SUD patients without PTSD were slightly higher than in the alcohol-dependent male patients without PTSD in the Evren et al. (2010) study. At least two explanations for the differences in prevalence and degrees of alexithymia in our patients and those of the Evren et al. (2010) study are possible. First, many of our patients had a SUD and/or an alcohol use disorder (AUD), instead of only an AUD. The prevalence of alexithymia in patients with a SUD (El Rasheed, 2001; Oyefeso et al., 2008) seemed to be relatively higher than in patients with AUD (Cruise and Beccera, 2018). Second, Evren et al. (2010) make no distinction between current PTSD and lifetime/not current PTSD.

As the range of the means of the TAS-20 (53.6–63.9) between the three groups did not differ that much, the clinical relevance of our finding could be questioned. Taylor et al., 1997 have suggested that a score >60 on the TAS-20 indicates clinically relevant alexithymia. Since we did find a difference in scores >60 between the current PTSD group and the other two groups, this could indicate a clinically relevant difference. However, in our view, it would be more clinically relevant to distinguish between a trait and state part of the TAS-20 score and assess the difference in TAS-20 scores after treatment of the PTSD. The difference in the prevalence and degree of alexithymia between the SUD patients with current PTSD and SUD patients with lifetime/not current PTSD in our study could be interpreted as an indication that at least a part of the alexithymia in the SUD patients with current PTSD has a state character.

To our knowledge, this is the first study to differentiate alexithymia by patient variables that are theoretically distinguished as more trait- or state-like characteristics. We found three patient variables (the severity

of PTSD; the degree of alcohol addiction; and a combination of depression, anxiety and stress symptoms) that explain a moderate proportion of the variance in alexithymia. Because these three variables are all theoretically more related to alexithymia as a state (Eichhorn et al., 2014; Frewen et al., 2006; Freyberger, 1977; Messina et al., 2014), we would expect a change in the degree of alexithymia related to a change in these three variables. The next step in validating these variables when predicting alexithymia as a state characteristic would be a follow-up measurement after enough time or an intervention aimed at change in these variables. Despite our finding that these three variables explained a moderate proportion of alexithymia, we have to look for other patient variables to improve our model, especially variables related to alexithymia as a trait characteristic. Suggestions for other trait-related patient variables include the following: genetic influence (Jørgensen et al., 2007), parental bonding (Thorberg et al., 2011), disturbed family functioning (Lumley et al., 1996), and dysfunction in interhemispheric transfer (Larsen et al., 2003; Paul et al., 2007).

A major limitation of this study is the cross-sectional design. No final conclusions can be drawn regarding the predictive value of the model. Therefore, we need a follow-up measurement of alexithymia after the variables related to alexithymia as a state characteristic have had enough time to change. A more general limitation is that only the TAS-20 was used to measure alexithymia. The TAS-20 is criticized for being a self-report inventory (Kooiman et al., 2002; Maes et al., 2015). Patients with alexithymia may not be aware of their deficits. Therefore, using an interview such as the Toronto Structured Interview for Alexithymia (TSIA) (Bagby et al., 2006), in addition to the TAS-20, would be better for the validity of measuring alexithymia. As the specificity of the high TAS-20 scores in SUD-patients is under critical discussion (Parolin et al., 2018),it would be interesting to study the relationship between PTSD and alexithymia in psychiatric patients without SUD and in the general population as a control group. To our knowledge no research has been conducted into the prevalence of alexithymia in the general population of the Netherlands. However, in the general population of Germany, a population largely comparable with the Dutch population, the prevalence of alexithymia (TAS-20 > 60) was 10% (Franz et al., 2008).

Because of the high prevalence of alexithymia in SUD patients with cooccurring PTSD, an assessment of whether a SUD patient has alexithymia characteristics is recommended. Next, our results have two other clinical implications. First, we expect that an increase in PTSD- and alcohol-related symptoms, and/or depression, anxiety, and stress symptoms possibly makes SUD patients more alexithymic. This requires paying attention to the approach to and treatment choice for these patients. Second, it is important to acknowledge that this increase could be temporary as the related variables improve.

In conclusion, we did find a significantly higher prevalence and degree of alexithymia in SUD patients with cooccurring PTSD in comparison with SUD patients without PTSD or no current PTSD. With respect to the prediction of alexithymia in a multiple regression model, we found that the patient variables of severity of PTSD complaints, alcohol addiction, depression, anxiety and stress symptoms explained 38.1% of alexithymia in SUD patients with cooccurring PTSD. All predictive variables were probably most related to alexithymia as a state. This finding means that a substantial number of patient variables that predict alexithymia are not included in our model, especially variables related to alexithymia as a trait.

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Declaration of Competing Interest

None.

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