Effect of Type D personality on medication adherence in early adolescents with asthma ☆

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ABSTRACT

Objective: Medication adherence for daily preventive asthma medication is especially low during adolescence. In the present study, we aimed to test whether Type D personality (both as a category and with its constituent components (negative affectivity: NA and social inhibition: SI) separately and in interaction) predicts medication adherence of early adolescents with asthma.

Methods: In a prospective study, 188 early adolescents with asthma who were prescribed daily preventive asthma medication completed questionnaires on Type D personality, medication adherence, socio-demographic and clinical information, and depressive symptoms in the Spring/Summer of 2011 (T1) and again 12 months later (T2). Multiple regression analyses, controlling for demographic and clinical information and for depressive symptoms, were conducted to test whether Type D personality (either as a categorical or dimensional construct) predicted changes in medication adherence over time.

Results: Adherence was significantly lower at T2 than at T1 and this decrease was predicted by the categorical construct of Type D personality. Analyses of the two separate dimensions NA and SI and their interaction showed that higher scores on NA at T1 predicted more decrease in adherence over time. Neither SI nor the interaction between NA and SI predicted changes in adherence.

Conclusion: This is the first study to test the relationship between Type D personality and medication adherence in adolescents. Although categorical Type D personality predicts mediation adherence of adolescent with asthma over time, dimensional analyses suggest that this is due to negative affectivity only, and not to the combination of negative affectivity and social inhibition.

Introduction

The World Health Organization estimates that 235 million people worldwide currently suffer from asthma [1]. Among 13–14 year olds, the prevalence of current asthma is 14.1% [2], which makes asthma one of the most prevalent chronic diseases in childhood and adolescence. Having asthma is associated with adverse outcomes during adolescence, such as limited physical activity, school absenteeism, reduced quality of life and more problems socialising with peers [3]. It is not possible to cure asthma, but it is possible to achieve and maintain control over asthma with pharmacological treatment, thereby reducing the negative impact that asthma could have. The most effective way to control asthma is by preventing airway inflammation through the use of daily asthma medication. Inhaled corticosteroids are most often prescribed [4]. The effects of daily asthma medication are significantly reduced in case of non-adherence [5,6]. Adherence is defined as the extent to which taking medication corresponds with the recommendations by a health care provider [7].

Non-adherence is very common in childhood [8], and in adolescence adherence rates are even lower than in children [9]. A recent study using electronic monitoring of adherence showed that adherence rates in 5–14 year old patients with uncontrolled asthma were as low as 31.2% [10]. It has been suggested that non-adherence by 5 to 16 year olds is due to simply forgetting and to an 'only-as-needed' approach, which means that these children do not understand the importance of the corticosteroid as preventive measures [11]. Possible explanations for an increase in the risk of non-adherence in adolescence are the onset of depressive symptoms and the presence of risk-taking behaviours that typically occur in adolescence, as well as the transfer of asthma management from parents to their children [12]. Given that adolescents with asthma are at risk for low adherence and consequently for uncontrolled asthma, it is important to look more closely into factors that could predict adherence in this group.

One factor that could potentially play a role in medication adherence of adolescents with asthma is Type D (distressed) personality. Type D personality refers to the combination of negative affectivity (NA; i.e., the tendency to experience negative emotions) and social

inhibition (SI; i.e., inhibited self-expression towards others) [13]. There is a rapidly growing number of studies that have investigated the relation between Type D personality and various health outcomes, both in clinical populations and in the general population [14,15]. Initially, Type D personality was proposed as a categorical construct: individuals high on both NA and SI were categorised as Type D. However, a study using taxometric procedures showed that Type D might be better represented as a dimensional construct [16]. It has also been argued that it would be better to look at the interaction of continuous NA and SI scores to test whether it is indeed the synergistic effect of NA and SI that could explain results [17].

Some studies have related Type D personality to adherence in adult patients [18–21]. A person with a Type D personality may be non-adherent through concerns about negative side-effects of medication and an inability to talk about these concerns. Using Type D as a categorical construct it was shown that adherence was significantly lower in patients with Type D personality than in patients without Type D personality in adult patient samples with coronary heart disease [20], myocardial infarction [21], sleep apnoea [18], and sleep-disordered breathing [19].

When looking at type D as a dimensional construct, the personality traits NA, SI and their interaction could influence medication adherence. Negative affectivity has been found to be highly correlated to increased reporting of subjective health complaints, likely because people with high NA have biased attention to and interpretation of normal symptoms as painful [22]. At the same time, people high on NA might adhere less to medication prescription because they are more negative about the effects of medication and expect more side-effects. With young adults, higher NA was significantly correlated with higher health-related cognitive distortions, which in turn predicted lower objective and self-reported medication adherence of diabetes medication [23]. The proposed explanation is that people with negative or irrational health beliefs do not believe in the benefit of medication. With regard to SI, people high on SI might have lower medication adherence, especially when medication has to be taken in a social situation. Additionally, people high on SI might adhere less because they tend to use more avoidant and passive coping strategies (e.g. denial) when dealing with (medical) problems [24].

Two recent studies investigated Type D as a dimensional construct and studied the interaction between NA and SI as well as the separate effect of the components NA and SI in predicting medication adherence [20,21]. A study with myocardial infarction patients found that both higher levels of NA in itself as well as higher levels of the components NA and SI in interaction predicted lower medication adherence after controlling for demographic and clinical risk factors [21]. However, in a study among patients with coronary heart disease, only higher levels of NA and not SI or the interaction between NA and SI predicted lower adherence [20]. The relationship between Type D personality and adherence has, to our knowledge, never been studied in adolescents.

In the present study, we aimed to test whether Type D personality (both as a category and with its constituent components (NA and SI) individually and in interaction) predicts medication adherence in early adolescents with asthma. In line with previous studies on adherence, it was expected that adolescents with a Type D personality (as a category) would have lower adherence rates than adolescents without a Type D personality. In addition, we expected more negative affectivity, but not more social inhibition, to predict poorer adherence when Type D personality was measured as a dimensional construct. Because of conflicting results in previous studies, no hypothesis was formulated in the current study about the interaction between the dimensions of negative affectivity and social inhibition.

Method

Procedure

The protocol of the study was approved by the ethics committee of the Faculty of Social Sciences of the Radboud University Nijmegen. A sample of 280 primary and 140 secondary schools in The Netherlands (excluding schools for special education) received a letter asking for the school's participation in this study. A total of 213 primary schools and 73 secondary schools agreed. These schools circulated letters to seventh and eighth graders in primary schools or first graders in secondary schools, and these children were asked to give the letter to their parents. The letter contained information about asthma in general, about the purpose and procedure of the study, an invitation for families with a 10–14 year old child with asthma to sign up, and information about the gift vouchers participating families would receive. In addition to approaching schools, an announcement of the study was published in the magazine of the Lung Foundation Netherlands to recruit participants. Interested families were included if the adolescent met the following criteria: (1) diagnosed with asthma by a physician, (2) having used asthma medication or experienced asthma-related symptoms at least once in the last twelve months, and (3) having adequate Dutch language skills. Of the 311 families that signed up, 261 families (83.9%) met the inclusion criteria; 46 families (14.8%) did not and were excluded, and four families (1.2%) cancelled for different reasons.

The families were visited at home twice, in March–September 2011 (Baseline: T1) and again a year later, in March–September 2012 (Follow-up: T2). Before visiting the families at home, research assistants were trained in administering the questionnaires and in performing a lung function test (using a portable spirometer and the Spida 5 software). Of the 261 participating families at T1, 258 families also participated at T2 (98.85%). On each visit, after brief instructions and the guarantee of anonymity, adolescents and at least one of their parents signed an informed consent form and completed the questionnaires. Additionally, adolescents performed the lung function test. The visits took one hour and fifteen minutes on average. The family received a gift voucher of 20 Euros for participation on each occasion.

Participants

For the present study, we included only the adolescents who were prescribed long-term asthma control medication at both T1 and T2 (N = 188). Their characteristics are presented in Table 1.

Measures

Type D personality

At T1, Type D personality was measured using the DS14 [13], which consists of two seven-item subscales assessing respectively negative

Table 1
Demographic characteristics of the participating adolescents at T1 (n = 188)

Gender[a]	Male	112 (59.57)
	Female	76 (40.43)
Age[b]		11.89 (1.03)
Years asthma[b]		7.48 (3.89)
Country of birth[a]	Netherlands	183 (97.86)
	Other	4 (2.14)
School adolescents[a]	Primary	92 (50.00)
	Secondary	92 (50.00)
Asthma severity[a,c]	Low	64 (34.04)
	Mild	87 (46.28)
	Moderate	24 (12.77)
	Severe	13 (6.91)
Asthma control[a,d]	Controlled	30 (15.96)
	Partly controlled	113 (60.11)
	Uncontrolled	45 (23.94)

[a] Values represent numbers and valid percentage (numbers may not add up to 188 due to missing values).
[b] Values represent the mean and standard deviation.
[c] Asthma severity is based on the Functional Severity Index [31].
[d] Asthma control is based on the Global Initiative for Asthma (GINA) guidelines [4].