Research Article

A longitudinal course of ICD-11 adjustment disorder symptom profiles: A 12-month follow-up study

Evaldas Kazlauskas [a] [*], Ask Elklit [b], Inga Truskauskaite [a]

[a] Center for Psychotraumatology, Institute of Psychology, Vilnius University, Vilnius, Lithuania

[b] National Center for Psychotraumatology, University of Southern Denmark, Odense, Denmark

Short title: ADJUSTMENT DISORDER SYMPTOM CHANGE

* Corresponding author:

Evaldas Kazlauskas, Center for Psychotraumatology, Institute of Psychology, Vilnius University, Ciurlionio 29, Vilnius, 01300, Lithuania. E-mail: evaldas.kazlauskas@fsf.vu.lt. Phone +370 5 268 6952

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Abstract

Introduction: Adjustment disorder is frequently diagnosed in clinical practice; however, the course of adjustment disorder over time has not yet been studied extensively.

Methods: This longitudinal study was one of the first that aimed to analyze trajectories of adjustment disorder symptoms in a 12-month follow-up among a high-risk community sample ($n = 205$) exposed to various stressors. Adjustment disorder symptoms were measured at baseline and 12-month follow-up with the Brief Adjustment Disorder New Module (ADNM-8) based on the definition of adjustment disorder provided in the 11th Edition of International Classification of Diseases (ICD-11) released in 2018 by the World Health Organization (WHO).

Results: A latent transition analysis of adjustment symptoms identified four distinct trajectories: 'high-symptom', 'recovery', 'onset', and 'low-symptom'. We found 46% of ICD-11 adjustment disorder at baseline, and 29% of the sample were classified as having a high-symptom adjustment symptom profile. The high- symptom profile was predicted by ongoing stressors, female gender, and higher education.

Conclusion: Study findings indicate that adjustment disorder among high-risk samples, in particular, those exposed to ongoing stressors, could have a high symptom course over 12 months.

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Introduction

Adjustment disorder is a highly debated mental disorder [1,2]. Although surrounded by controversies, such as whether an adjustment to challenges of life should be labeled in clinical diagnostic terms, ongoing criticism for the lack of the distinctive symptom profile, and the subsyndromal diagnostic status, adjustment disorder remains widely used in clinical practice [3,4]. As one of the most frequently used psychiatric disorders among psychiatrists and psychologists [5,6], adjustment disorder has been surprisingly rarely studied in empirical research [1,4]. The new wave of adjustment disorder studies [7] was mainly associated with the updated definition of adjustment symptom profile in the 11th Edition of the International Classification of Diseases (ICD-11) released by the World Health Organization (WHO) in 2018 [8]. Adjustment disorder is a significant mental health issue associated with the COVID-19 pandemic [9–11], which increased interest in this diagnosis over recent years. The COVID-19 pandemic related-stressors were found to be associated with increased risk for adjustment disorder [12].

Adjustment disorder in ICD-11 is defined in a chapter of *Disorders Specifically Associated with Stress* as a maladaptive response to the identifiable life stressor or multiple stressors (interpersonal, health-related, work-related stressors, or socio-economic difficulties) that typically emerges within a month of a stressor. Adjustment disorder in ICD-11 is characterized by two core symptoms: (1) preoccupation with a stressor and (2) failure to adapt to the stressor, and these symptoms causing significant impairment in the functioning of an individual [8]. Adjustment disorder typically resolves within six months, although it could have a longer duration if the stressor persists. Studies across various populations supported the validity of the ICD-11 symptom profile of adjustment disorder [13,14]. Furthermore, the new measures for ICD-11 adjustment disorder were developed and validated recently [15,16], facilitating this line of research.

The prevalence of adjustment disorder in the general population is 1-2%, with higher prevalence rates in high-risk groups, e.g., 18% among recently unemployed, and 35% in patients with

breast cancer [4]. The course and recovery rates of adjustment disorder over time are not clear though. Treatment studies indicated that ICD-11 adjustment disorder could be successfully treated in psychosocial interventions [17–19]. However, the majority of adjustment disorder studies are cross-sectional or retrospective, and due to the lack of longitudinal studies, the course of adjustment disorder remains unknown. It has not been empirically tested across various samples if adjustment disorder usually resolves in six months as described in the definition in ICD-11 [8] or if it can be a condition that could last longer.

To the best of our knowledge, only two studies have been conducted that specifically explored trajectories of adjustment disorder in longitudinal studies. A recent study in Switzerland explored ICD-11 adjustment disorder symptom change following job loss using a latent class growth analysis approach [20] and found that 16% of the study participants had a high stable profile of adjustment disorder symptoms at 6-month follow-up, further analysis of adjustment disorder at 12-month revealed 2.9% prevalence among a smaller subsample of the Swiss study ($n = 105$) [21]. The other study in Australia found a 19% and 16% prevalence of DSM-5 adjustment disorder after an injury at 3-month and 12-month follow-ups, respectively [22], with around 7% of the sample having a prolonged trajectory of adjustment disorder [22].

The present study was one of the first to test the trajectories of ICD-11 adjustment disorder in a high-risk community sample exposed to various stressors. We aimed to analyze adjustment disorder symptom stability and change at a 12-month follow-up using a latent transition analysis approach. Furthermore, we aimed to explore the predictors of prolonged adjustment disorder symptoms and recovery at a 12-month follow-up.

Materials and Methods

Participants and procedure

Data for this study was extracted from the larger Vilnius Adjustment Disorder Study (VADS) conducted at the Center of Psychotraumatology at Vilnius University, Lithuania [14,23]. This paper reports previously unpublished findings from the VADS longitudinal study. Participants of the study

were recruited at social services, primary health centers, and community service centers via a network of collaborating psychologists across 19 sites in Lithuania. The inclusion criteria for this study were: (1) ≥ 18 years old; (2) exposure to at least one recent significant life stressor; (3) completion of measures.

In total, 312 participants were recruited for the first wave (T1) of this study. T1 data collection was conducted from February to April 2017 in individual interviews. The second wave data were collected at a 12-month follow-up (T2) in telephone interviews. Around one-third of participants (34.3%, n = 107) were not reached at T2 because of the following reasons: 7.7% (n = 24) refused to participate in the study, and 26.6% (n = 83) were not reached in three attempts at a different time of the day over two-weeks at the follow-up. The final sample included in the study constituted of 205 participants, 77.5% female. Participants' age ranged from 18 to 72 years, and the mean age was 34.06 (SD = 11.63). The demographic characteristics of the sample are presented in Table 1. In total, 13.7% (n = 28) of study participants were receiving medication for their mental disorders, and 22.4% (n = 46) received some psychological therapy during the study; however, the treatment target was not adjustment disorders.

Dropout analysis revealed that the sample included in the analysis was similar to participants who were not reached at T2 in sociodemographic characteristics, stressor exposure, and adjustment disorder symptoms. We found no significant effect of age, gender, accumulative life stressor exposure, or adjustment disorder symptoms on dropout. However, we reached more participants from urban areas (71.4% among dropout vs 87.2% among retained participants, χ^2 (1) = 10.23, p = 0.001), and with higher education (38.3% vs 51.2% holding university degree among dropout and retained participants respectively, χ^2 (1) = 4.20, p = .041) at T2.

< Insert Table 1 here >

Measures

The Brief Adjustment Disorder – New Module (ADNM-8) was used for the assessment of ICD-11 adjustment disorder symptoms in the study [15]. The ADNM is a widely used measure in

ICD-11 adjustment disorder studies [7]. The ADNM-8 has two parts: (1) a list of various life stressors, and (2) symptom items measuring two core ICD-11 adjustment disorder symptoms: preoccupation and failure to adapt. The Lithuanian language ADNM-8 has been used in basic and treatment studies of adjustment studies previously, consistently reporting good psychometric properties across various samples [19,23,24]. Furthermore, a recent validation revealed good psychometric properties and validity of the ADNM-8 in the large Lithuanian treatment-seeking sample [15].

The first part of the ADNM-8 comprised a list of 15 life stressors. Participants were asked to indicate whether they experienced any of the listed stressors in the last one or two years which was associated with significant difficulties over the last six months. The sum of the indicated stressors was used as an indicator of the overall exposure to life stressors. Additionally, based on the findings from the previous study of adjustment disorder predictors [23] we identified life stressor exposure in the three categories utilizing the ADNM-8 life stressors list: (1) interpersonal stressors (two items: separation, conflicts in a family); (2) work-related stressors (five items: conflicts at work, two much or too little work, unemployment, difficulties adjusting to retirement, and financial difficulties); (3) health-related stressors (two items: serious illness, disease of someone close/caregiving). Reporting at least one stressor from any of the three categories of stressors was identified as an experience of interpersonal, work-related, or health-related stressors using binary yes/no code in each of the stressor categories.

The second part of the ADNM-8 is comprised of the two subscales measuring (1) preoccupation (four items), and (2) failure to adapt (four items) symptoms. Participants were asked to indicate the frequency of each of the symptoms over the last week on a four-point Likert-type scale ranging from 1 = '*Never*' to 4 = '*Often*'. The total score of the ADNM-8 is the sum of the eight items with a range of 8 to 32, with a higher score indicating higher levels of adjustment disorder symptoms. Preoccupation and failure to adapt scores were computed by summing the responses on all four items comprising the subscales. The cut-off of the ADNM-8 for adjustment disorder in the study was data-driven using the statistical analysis approach described below in the data analysis section of this paper based on the symptom severity of preoccupation and failure to adapt. Internal consistency of the

ADNM-8 symptoms items was high for the full ADNM-8 scale at both time-points of the study with Cronbach's α equal to 0.91 at T1, and α = 0.87 at T2. Furthermore, α was .88 at T1, and α = 86 at T2 for the preoccupation subscale, and α = .81 at T1, and α = .72 at T2 for the failure to adapt subscale revealing high internal consistency for adjustment disorder core symptoms subscales. Confirmatory Factor Analysis (CFA) of a two-factor model also yielded a good model fit in our study both at T1 (χ^2 (19) = 32.660, p = .026, CFI/TLI = .980/.971, RMSEA [90% CI] = .059 [.020, .093], SRMR = .029), and at T2 (χ^2 (19) = 39.039, p < .01, CFI/TLI = .962/.945, RMSEA [90% CI] = .072 [.039, .104], SRMR = .036).

Data analysis

To address the research questions of the current study, we used Latent Transition Analysis (LTA) approach [25]. We fitted the models of Latent Class Analysis (LCA) by using two indicators of adjustment disorder symptoms, namely, sum scores of adjustment disorder symptoms of preoccupation and failure to adapt, at baseline and 12-month follow-up separately and tested the longitudinal invariance of class solution. We used several criteria to decide on the number of latent classes [26]. First, Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) statistic for a solution with k classes should be lower than for a solution with k - 1 classes. Second, a statistically significant p-value of the adjusted Lo, Mandel, and Rubin test, which compares improvement in fit between neighboring class solutions, determined improvement in fit through the inclusion of an additional class. Third, we evaluated the substantive meaningfulness of the latent classes [27]. Hence, if a solution with k classes do not have differential substantive meaning, the more parsimonious solution with k - 1 classes was chosen. Additionally, in all analyses, we used the Entropy score, with the values equal or above .70 indicative of accurate classification. Additionally, longitudinal invariance of the classes solution is established when there is no statistical difference between the models with fixed versus free estimation of the parameters across the time points. LTA analyses were conducted with Mplus 8.2. [28]. Further, we applied multivariate logistic regression to identify predictors of adjustment disorder and the identified LTA classes using IBM SPSS Statistics version 25.

Results

Prevalence of stressors and associations with adjustment disorder symptoms

Participants reported experience of 3.13 ($SD = 1.99$) life stressors on average at T1. The most prevalent stressors in the sample were work-related stressors (63.4%), followed by health-related stressors = 43.4%, and interpersonal stressors = 42.4% (See Table 1). Around one-third of the sample (36.6%, $n = 75$) reported exposure to life stressors in two areas, while all three of the identified stressor areas (work, health, or interpersonal) were experienced by 11.7% ($n = 24$) of the sample. The most prevalent stressors in the sample were, conflicts in family (34.1%), disease of someone close/caregiving (32.7%), unemployment (29.3%), conflicts at work (25.4%), financial difficulties (24.9%), serious illness (16.1%). About half of the sample (53.2%) reported experiencing significant life stressors over the last 12-month at follow-up.

< Table 2 >

Descriptive statistics and correlations of the adjustment disorder symptoms at T1 and the 12-month follow-up are presented in Table 2. Adjustment disorder symptoms at T1 and T2 were significantly correlated. Moreover, stressor exposure was associated with adjustment disorder symptoms. The number of significant life stressors at baseline was associated with adjustment disorder symptoms both at T1 and at T2. The reported exposure to life stressors over the last 12-month was associated with baseline stressor exposure, as well as with adjustment disorder symptoms at T1 and 12-month follow-up (see Table 2)

< Table 3 >

Identification of the symptom patterns and their invariance over time

The results of LCA revealed that based on the chosen criteria, both two and three classes solutions fitted the data well (Table 3). However, as the two classes solution was more meaningful in reflecting low versus high symptoms and conceptually fitted clinical approach in terms of diagnosis versus no diagnosis, we have chosen the more parsimonious two-class solution. The longitudinal invariance test confirmed that the two classes solution was invariant across the two time-points and LTA could be performed. The profiles of two latent statuses, based on the means of two adjustment disorder symptoms, particularly, preoccupation and failure to adapt, are presented in Figure 1.

<Insert Table 3 here>

<Insert Figure 1 here>

The LTA yielded good classification quality (Entropy = .812) (See Figure 2). The results revealed that over three-fourths of study participants did not change their statuses, thus, remained in either the low or high symptom group over twelve months. However, more than 20% of the study sample showed either an increase or decrease in adjustment disorder symptoms, with more participants in the latter group. Based on the LTA results we could identify four groups of participants with distinct adjustment symptom profiles: "low symptom" (47.3%), "prolonged" (28.8%), "recovery" (17.6%), and "onset" (6.3%) (See Figure 2).

<Insert Figure 2 here>

Predictors of adjustment disorder

Around half of the sample (46.3%, $n = 95$) had high levels of adjustment disorder symptoms at T1, according to the LTA analysis. Multivariate binary logistic analysis revealed that gender ($OR = 4.12$, $p = .002$), university degree ($OR = 2.30$, $p = .027$), and stressor experiences predicted adjustment disorder at T1 (See Table 4). In particular, exposure to interpersonal stressors ($OR = 5.76$, $p < .001$), health-related ($OR = 2.65$, $p = .008$), and work-related stressors ($OR = 1.84$, $p = .001$) were all significant stressor exposure predictors of adjustment disorder at T1. Other demographic variables,

such as the age of the participant and rural place of residence, did not significantly predict adjustment disorder at T1.

Further, we analyzed the predictors of the adjustment disorder transition profiles. Almost two-thirds of the participants (62.1%, $n = 59$) who had high symptom levels of adjustment disorder at T1 had high levels of adjustment disorder symptoms at T2. We found that gender and education were important predictors of prolonged adjustment disorder profile, similar to adjustment disorder predictors at T1. Furthermore, we found that exposure to life stressors over the last 12-month ($OR = 3.60$, $p = .002$) significantly predicted prolonged adjustment disorder symptom profile. Receiving psychological services predicted prolonged adjustment disorder significantly ($OR = 4.12$, $p = .037$), whereas receiving medication for mental disorders did not (See Table 4).

Less than half of participants with adjustment disorder at T1 (37.9%, $n = 36$) recovered in 12-month. We could not identify significant predictors of recovery from adjustment disorder over the 12-month, potentially due to rather small sample size. However, we found that lower exposure to stressors over the last 12-months was more likely to be associated with recovery from adjustment disorder symptoms ($OR = 0.45$, $p = .076$) (See Table 4).

<Insert Table 4 here>

Discussion

This was one of the first studies which aimed to analyze stability and change of ICD-11 adjustment disorder symptoms in a longitudinal study. About half of the high-risk community sample exposed to various life stressors had high symptoms of adjustment disorder at baseline. Moreover, around one-third of the sample (29%) had high symptom adjustment disorder profile over one year in our study. Our findings are in line with previous studies which reported that adjustment disorder can be a long term condition lasting for 6-months [20] or 12-months [22]. However, we found higher rates of high symptom adjustment disorder profile in contrast to previous studies [21]. The previous longitudinal studies of ICD-11 adjustment disorder explored trajectories of the disorder among

samples exposed to a specific stressor, such as job loss. In our study, however, the high-risk sample was exposed to multiple stressors, with an average of the three recent life stressors. Multiple stressor exposure may contribute to a long-term course of adjustment disorder. Moreover, the high symptom adjustment disorder profile in our study was predicted by exposure to stressors over the last 12-month, indicating that chronic stressors contribute to the long-term course of adjustment disorders in line with the adjustment disorder definition in ICD-11 [8].

In line with previous studies, we found that the female gender was associated with a higher risk and high symptom adjustment disorder profile [23,29,30]. Our study, as well as previous studies that found effects of gender on adjustment disorders, should be interpreted with caution as in these studies the majority of study participants were female. Furthermore, higher education was associated with a high risk for adjustment disorder confirming previous studies that found that, in contrast to the majority of other mental disorders, higher education is associated with a risk for adjustment disorders [23]. Potentially, this is because higher education might be associated with higher responsibilities and more demanding work environments, and we found in our study that work-related stressors significantly predicted adjustment disorder.

Using psychological services was associated with high symptom adjustment disorder profile in our study. As our study was not a treatment study, we were not controlling what treatment participants received. We could hypothesize that participants with high adjustment problems tend to seek psychological services more. Furthermore, relatively small proportion of the sample was seeking help in our study. This is possibly due to the specific cultural context of Lithuania where stress-related disorders are not routinely recognized and diagnosed in national health care [31].

There are several limitations in this study. The course of the adjustment disorder symptoms was estimated among retained the study participants only. While dropout analysis revealed that retained participants did not differ significantly in adjustment disorder symptom levels, stressor experiences, and main sociodemographic characteristics, the dropout could affect study findings. We relied on a brief screening of adjustment disorder in our study. The data-driven approach used in our study confirmed the cut-off of ≥ 23 for the total score of the ADNM-8 for measuring adjustment disorders utilized in previous studies [23,32]. Moreover, there is a substantial evidence that the

ADNM-8 is a valid and reliable screening tool for adjustment disorder [33]. However, structured clinical interviews could give a more reliable clinical picture of adjustment disorder symptoms.

We analyzed various life stressors and the role of stressors on adjustment disorder, however, a more detailed analysis and the duration of stressors could give more insights. Further studies could explore how exposure to work-related stressors, as well as health-related stressors or interpersonal stressors, contribute to the long-term course of adjustment disorders or recovery.

Furthermore, we admit that the course of the symptoms is affected not only by stressors but also by social support and treatments received by an individual. We only were able to have a rough estimation of psychological and medical treatment received by study participants for mental disorders in the study. Due to data protection of study participants, and limitations of our study design, we could not estimate how many psychotherapy sessions received by participants, neither we were able to get access to records on the type and dose of medication which was used by the participants. Still, our study indicates that individuals with high adjustment disorder symptoms are more likely to seek psychological treatment. Previous studies found that psychological interventions targeted adjustment disorder, especially internet-interventions could reduce the burden of symptoms [17,19,34]. However, as this was not a treatment study, and access to psychological treatments in Lithuania is restricted, we had a rather small number of participants who received treatment.

Finally, the study was focused on adjustment disorder symptoms solely and did not evaluate the symptoms of other mental disorders. However, for a more comprehensive understanding of study findings, adjustment disorder should be analyzed in a broader context of stress- and trauma-related mental disorders, such as posttraumatic stress or complex posttraumatic stress disorder, and prolonged grief disorder [35]. We applied the methodology used in multiple previous adjustment disorder studies [20], including intervention studies [19,36] which focus primarily on adjustment disorder symptoms. The sample in our study could have other mental disorders which we were not able to screen for. Despite this limitation, our study is still informative and provides valuable insights on the trajectories of adjustment disorder symptoms and predictors of adjustment disorder symptoms. Future studies should include measures of other mental disorders to have a more detailed clinical picture of mental disorders, such as posttraumatic stress disorders, anxiety disorders, or depression, following

significant life stressors. Moreover, innovative online solutions for the assessment of adjustment disorder symptoms are important, as the COVID-19 pandemic revealed the importance of online mental health services.

We conclude that adjustment disorder has high prevalence rates among high-risk groups exposed to various stressors, such as interpersonal stressors, work-related stressors, or health-related stressors. Furthermore, our study shows that adjustment disorder could have a long-term course with symptoms lasting over 12 months. Ongoing stressors, female gender, and higher education were found to be the significant predictors of high adjustment disorder symptoms. Clinicians should be aware of the high prevalence of adjustment disorder in populations exposed to stressors and could utilize screening instruments for adjustment disorder along with other mental disorders assessments, such as depression and anxiety. The study raises awareness of clinicians that in high risk samples significant proportion of individuals, especially those exposed to multiple stressors, could have a high prevalence of adjustment disorder, and treatments targeted towards adjustment disorder symptoms are necessary to reduce the burden of these symptoms.

Statement of Ethics

The study was conducted in accordance with the World Medical Association Declaration of Helsinki and approved by the Committee for Psychological Research Ethics of Vilnius University (Reference number: 2016-04-05 Nr.8). All study participants gave written informed consent prior to data collection.

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Conflict of Interest Statement

Authors have no conflicts of interests to declare.

Author Contributions

Evaldas Kazlauskas = Writing—original draft, Conceptualization, Methodology, Supervision,

Ask Elklit = Writing—review & editing, Inga Truskauskaite = Formal analysis, Writing—

review & editing.

Data Availability Statement

The dataset used in this work is available from the corresponding author on reasonable

request.

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Figure 1. Latent statuses of adjustment disorder symptoms at baseline and 12-month follow-up

Figure 2. Latent transition patterns of adjustment disorder