

Institute for Child and Youth Health Care of Vojvodina, Novi Sad¹
Preschool Teacher Training College, Novi Sad, Serbia²

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ANXIETY SENSITIVITY IN ADOLESCENTS WITH SOMATOFORM AUTONOMIC DYSFUNCTION AND ADOLESCENTS WITH INSULIN DEPENDENT DIABETES MELLITUS

SENZITIVNOST NA ANKSIOZNOST KOD ADOLESCENATA SA SOMATOFORMNOM DISFUNKCIJOM VEGETATIVNOG NERVNOG SISTEMA I ADOLESCENATA SA INSULIN-ZAVISNIM DIJABETESOM MELITUSOM

Maja PISARIĆ¹ i Sanja NIŠEVIĆ²

Summary - Anxiety sensitivity is defined as a belief that anxiety or fear may cause illness, embarrassment, or additional anxiety. The main purpose of this study was to find out if there were differences among adolescents with insulin dependent diabetes mellitus, adolescents with somatoform autonomic dysfunction and their healthy peers in different aspects of psychological functioning and anxiety sensitivity. The sample consisted of 93 subjects, aged 12 to 16. Hamburg Neuroticism and Extraversion Scale, Child Behaviour Checklist and Childhood Anxiety Sensitivity Index were administered. The adolescents with somatoform autonomic dysfunction had significantly higher scores on neuroticism scale, different Child Behaviour Checklist subscales, and on anxiety sensitivity. Both groups with diagnosed illness had lower scores on extraversion scale compared to healthy peers. This study has shown that the adolescents with somatoform autonomic dysfunction are more prone to fears regarding bodily functioning, and that they are at a higher risk of developing an anxiety disorder.

Key words: Anxiety; Neurotic Disorders; Adolescent; Autonomic Nervous System Diseases; Somatoform Disorders; Diabetes Mellitus, Type 1; Questionnaires

Introduction

Anxiety sensitivity (AS) is usually defined as a fear of sensations related to anxiety developing from the belief that these sensations might have harmful somatic, psychological or social consequences [1]. The theoretical and practical significance of AS has been recognized only recently due to the expansion of cognitive theories of fears, phobias and panic attacks. Less is known of AS in children than about AS in adults. It is believed that children may learn to connect physiological symptoms with negative consequences as well as that the childhood may be the critical period for anxiety related problems [2]. Individual differences in AS are thought to be partly due to not only genetic factors, but also to different learning patterns. Learning may be related to experiences connected with bodily sensations, but also, although to a lesser extent, to a parental reinforcement of the child's role of a patient because of somatic sensations [3].

Previous research of AS in adolescents [4] showed that adolescents with somatoform autonomic dysfunction (SAD) differ from their healthy peers mostly in general anxiety sensitivity as well as in internalizing problems. It has also been found that they demonstrate more neurotic characteristics and less extraversion, especially the part of extraversion concept that is connected with social behaviour. The main features of SAD are based on objective signs of the vegetative nervous system, such as rapid heart beating, breathing, sweating, paleness, tremor, etc.

The question was whether adolescents with chronic illness developed AS more often than their healthy peers. Studies including persons with insulin dependent diabetes mellitus (IDDM) have shown that they de-

velop anxiety and depression more often than it is the case in general population. One of possible complications of IDDM is hypoglycaemia, which is followed by physiological reactions including tremor, general weakness, confusion and lack of concentration. The main purpose of this study was to find out if adolescents with IDDM had higher neurotic characteristics, behaviour changes and higher AS when compared to adolescents with SAD and their healthy peers.

Material and Methods

The study sample consisted of 93 subjects aged from 12 to 16 years. They were assigned to one of three groups, each consisting of 31 subjects: adolescents with SAD, adolescents with IDDM and healthy adolescents. The participation in this study was voluntary, anonymous, and the informed consent was signed both by the adolescents and their parents. The healthy adolescents were pupils attending primary and secondary schools in Novi Sad. Both SAD and IDDM were diagnosed by a paediatrician-endocrinologist at the Institute for Child and Youth Health Care of Vojvodina in Novi Sad. There were no significant differences among subjects regarding gender or age (Wilks Lambda=0.97, (4, 178); p=0.54).

The following scales were administered:

1. *Hamburg Neuroticism and Extraversion Scale for Children and Adolescents* [5] (HANES), a questionnaire for self assessment of personality traits for children aged from 8 to 16 years. It contains three subscales: neuroticism, extraversion, and lie subscale. The questionnaire consists of 68 items to which a person should reply circling one of the two an-

Abbreviations

AS	– anxiety sensitivity
SAD	– somatoform autonomic dysfunction
IDDM	– insulin dependent diabetes mellitus
HANES	– Hamburg Neuroticism and Extraversion Scale for Children and Adolescents
CBCL	– Child Behavior Checklist
CASI	– Childhood Anxiety Sensitivity Index

swers "Yes" or "No". The test-retest scale reliability was, depending on subscale, from 0.62 to 0.75 [5].

2. *Child Behaviour Checklist* [6] (CBCL) is a questionnaire for children aged from 6 to 18 years. It consists of 113 items, and 9 subscales: withdrawal, somatic complaints, anxiety/depression, social problems, thought problems, attention problems, delinquent and aggressive behaviour, and other problems. There are three answers to choose from 0 – not true, 1 – sometimes true, and 2 – always true, that should be scored from 0 to 2 points. Cronbach Alpha coefficient of internal consistency in the sample of 459 children and adolescents aged from 12 to 18 years was 0.96, and the average test-retest reliability was $r = 0.89$ [6]. The questionnaire was not standardised on our population. The permission to use it in this study was obtained.

3. *Childhood Anxiety Sensitivity Index* [7] (CASI) is an instrument for assessing sensitivity to anxiety symptoms in children and adolescents. CASI is an 18 item Lykert type scale. It is answered by circling the answer that describes how often a person feels in a certain way, with three possibilities of frequency offered: "little", "some", or "a lot", scoring 1, 2, or 3 points. The final score is a sum of 18 items, which can go from 18 to maximum of 54, the higher the scores the higher AS. Cronbach Alpha coefficient in the sample of 62 children, both healthy and with SAD, aged from 12 to 16 was 0.84 [4]. CASI is not standardised on our population. It was translated into Serbian and used in our research with the permission of the authors¹.

Results

Data were processed with "Statistica 5.0 for Windows" [8], and Multiple analysis of variance and descriptive methods of analysis were used. The results (**Table 1**) show significant differences between the compared groups, Wilks' Lambda= 0.12, (32, 150); $p=0.00$. The adolescents with SAD (**Table 2**) had significantly higher scores on neuroticism scale, when compared to two other groups. The adolescents with IDDM or SAD described themselves with lower scores on extraversion scales compared to their healthy peers. When adolescents were compared by CBCL subscales, there were significant differences on withdrawal, somatic complaints, anxiety/depression, social problems, thought problems, and attention problems subscales. In subscales delinquency, aggressive behaviour or other problems, there were no differences among the compared groups. Anxiety sensitivity was shown to be the

Table 1. MANOVA Results

Tabela 1. MANOVA rezultati

Variables Varijable	Mean square Effect/Srednji kvadrat efekta	Mean square Error/Srednji kvadrat greške	F(df1,2) 2,118	p-level p-nivo
Neuroticism 1/Neuroticizam 1	184,6559	23,82652	7,75002	,000784
Neuroticism 2/Neuroticizam 2	313,0430	20,06237	15,60349	,000002
Extraversion 1/Ekstraverzija 1	15,3226	1,24014	12,35549	,000018
Extraversion 2/Ekstraverzija 2	8,7849	3,02222	2,90678	,059799
Lie scale/L skala iskrenosti	2,0753	6,09964	,34023	,712519
Withdrawal/Povlačenje	71,3548	6,67240	10,69403	,000068
Somatic complaints Somatske žalbe	300,2043	9,02079	33,27916	,000000
Anxiety/Depression Anksioznost/depresivnost	347,1075	25,90036	13,40165	,000008
Social problems Socijalni problemi	44,3979	3,86093	11,49926	,000036
Thought problems Problemi mišljenja	94,0107	7,81004	12,03717	,000023
Attention problems Problemi pažnje	115,6559	10,16272	11,38040	,000023
Delinquent behaviour Delinkventno ponašanje	,2043	1,42796	,14307	,866888
Aggressive behaviour Agresivno ponašanje	18,6129	1,42796	1,27598	,284157
Other problems/Drugi problemi	194,7419	26,87814	7,24537	,001209
Anxiety sensitivity Senzitivnost na anksioznost	749,4516	13,92832	53,80777	,000000

highest in the adolescents with SAD, then in those with IDDM, while their healthy peers had the lowest scores.

Discussion

The research question in the study was directed at finding out possible differences in neuroticism, behavioural problems and AS level among adolescents with IDDM, adolescents with SAD and healthy adolescents. The data in this study showed that the adolescents with SAD had the highest scores on neuroticism scale when compared to two other groups. These adolescents portrayed themselves as more immature, more sensitive to their social environment and more prone to feeling insulted. They tend to be inattentive, to have doubts and change moods, mostly towards depressive feelings. In addition, they are more concerned about their health; they have more fears regarding future events, as well as higher anxiety and distractibility. Extraversion, defined through two subscales, E_1 , measuring joy because of being with others, and E_2 , measuring activity level, was statistically different for the subscale E_1 . Both adolescents with SAD and adolescents with IDDM described themselves as being less extroversive compared to adolescents with no illness.

CBCL revealed that the adolescents with SAD when compared to the adolescents with IDDM and healthy adolescents were more often withdrawn, had more somatic complaints, higher anxiety and/or depression, had more social problems, more thought problems, and more problems with attention. It was also shown that the adolescents with SAD had the highest scores on CASI.

¹ Permission to use CASI was obtained through the project "Cognitive vulnerability to anxiety and depression" by Ljiljana Mihić, PhD.

Table 2. Means of variables**Tabela 2.** Aritmetičke sredine pojedinačnih varijabli

Variables Varijable	Adolescents with SAD <i>Adolescenti sa SDVNS</i>	Adolescents with IDDM <i>Adolescenti sa IZDM</i>	Healthy ado- lescents <i>Zdravi adolescenti</i>
Neuroticism 1/ <i>Neuroticizam 1</i>	28,93548	24,64516	24,77419
Neuroticism 2/ <i>Neuroticizam 2</i>	33,41935	30,16129	27,06452
Extraversion 1/ <i>Ekstraverzija 1</i>	15,74194	15,90323	17,03226
Extraversion 2/ <i>Ekstraverzija 2</i>	12,22581	11,16129	11,70968
Lie scale/ <i>L skala iskrenosti</i>	15,93548	16,22581	16,45161
Withdrawal/ <i>Povlačenje</i>	12,06452	10,45161	9,03226
Somatic complaints/ <i>Somatske žalbe</i>	15,83871	10,83871	10,12903
Anxiety/Depression <i>Anksioznost/depresivnost</i>	26,22581	21,54839	19,74194
Social problems/ <i>Socijalni problemi</i>	12,45161	11,64516	10,09677
Thought problems/ <i>Problemi mišljenja</i>	11,45161	8,45161	8,41935
Attention problems/ <i>Problemi pažnje</i>	16,90322	13,80645	13,35484
Delinquent behaviour <i>Delinkventno ponašanje</i>	12,80645	12,96774	12,90323
Aggressive behaviour <i>Agresivno ponašanje</i>	28,48387	27,35484	27,00000
Other problems/ <i>Drugi problemi</i>	28,48387	25,41936	23,51613
Anxiety sensitivity <i>Senzitivnost na anksioznost</i>	33,12903	27,09678	23,38710

These adolescents demonstrated more fear from somatic manifestation of anxiety, such as fear of breathing problems, high heart rates, vomiting, etc., as well as fear of inadequate mental and social functioning.

Although variables, such as somatic complaints, anxiety and depression, which make significant difference among groups represent relatively typical characteristics of people with SAD, this study showed that adolescents with SAD had more increased fears from bodily functioning, i.e. higher AS. It could be assumed that because of the present autonomous nervous system arousal, these adolescents would be more prone to develop some of anxiety disorders [9-11]. We should also bear in mind a sudden symptom appearance in SAD, with possible subjective experience and/or misinterpretation that it is uncontrollable. They may be wrongly understood and symptoms further reinforced, with consequent mounting feelings of fear.

Studies on signs and symptoms of SAD in persons with IDDM are not conclusive. Some of them have

shown that signs of autonomic dysfunction appear but in early phases of illness [12], while the results of other studies showed that there were no autonomic arousals in children and adolescents with good metabolic control [13,14]. For the adolescents in this study there were no data on illness duration and metabolic control, which is considered to be a weakness of this study, and should be assessed in further studies. One of the possible explanations regarding the results obtained in the adolescents with IDDM in our study might be that timely and adequately presented information regarding illness as well as procedures which may prevent complications could contribute to better coping with illness both in parents [15] and in children [16-18].

Adolescents with SAD interpret bodily sensations as terrifying. This belief is included in broader AS construct definition [1], which says that people with AS hold to the belief that bodily sensation have harmful somatic, psychological, or social consequences. Adequate approach to children and adolescents with IDDM, which assumes education and preparation for further suitable functioning and living with illness, would probably prevent dysfunctional interpretation of bodily sensations [16].

Conclusion

In this study we found that the adolescents with somatoform autonomic dysfunction, when compared to the adolescents with insulin dependent diabetes mellitus or healthy adolescents, had significantly higher scores on neuroticism scale, on Child Behaviour Checklist subscales (withdrawal, somatic complaints, anxiety/depression, social problems, thought problems, attention problems) and higher scores on anxiety sensitivity. Both groups with diagnosed illness had lower scores on extraversion scales compared to their healthy peers. Childhood Anxiety Sensitivity Index seems to be a sensitive instrument and it could be used as a good tool to identify adolescents who misinterpret autonomic arousal in a catastrophic way. It may show which adolescents may need extra attention in a preventive manner, even when there are no clear signs or symptoms of disorder, except somatoform autonomic dysfunction. These adolescents may be at a higher risk of developing some anxiety disorders.

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Sažetak

Uvod

Senzitivnost na anksioznost definiše se kao strah od senzacija u vezi sa anksioznosti koja nastaje iz verovanja da ove senzacije mogu da imaju štetne telesne, psihološke ili socijalne posledice. Postavljeno je pitanje da li se kod adolescenata sa nekom hroničnom bolešću, senzitivnost na anksioznost ispoljava u većem stepenu nego kod zdravih. Cilj ovog istraživanja bio je da se ispita da li postoje razlike između adolescenata sa insulin-zavisnim dijabetesom melitusom, adolescenata sa somatoformnom disfunkcijom vegetativnog nervnog sistema i zdravih u senzitivnosti na anksioznost i određenim aspektima psihološkog funkcionisanja.

Materijal i metode

U istraživanju je učestvovalo 93 ispitanika, uzrasta od 12 do 16 godina, ujednačenih u odnosu na pol i uzrast. Primljeni su: Hamburška skala neuroticizma i ekstraverzije za decu i omladinu, Lista provere dečjeg ponašanja i Indeks senzitivnosti na anksioznost kod dece.

Ključne reči: Anksioznost; Neurotski poremećaji; Adolescenti; Bolesti autonomnog nervnog sistema; Somatoformne disfunkcije; Dijabetes melitus, tip 1; Upitnici

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Rezultati

Multivarijatom analizom varijanse pokazano je da adolescenti sa somatoformnom disfunkcijom vegetativnog nervnog sistema imaju više skorove na skalama neuroticizma, supskalama Lista provere dečjeg ponašanja (povlačenje, somatske žalbe, anksioznost/depresivnost, socijalni problemi, problemi mišljenja, problemi sa pažnjom) i senzitivnosti na anksioznost.

Diskusija

U ovom uzorku adolescenti sa somatoformnom disfunkcijom autonomnog nervnog sistema svoju povećanu autonomnu pobudljivost interpretiraju na katastrofičan način, zbog čega su možda u grupi sa rizikom od razvoja različitih poremećaja.

Zaključak

Aдекватne i pravovremene informacije o bolesti, kao i o postupcima, koji mogu da preduprede razvoj mogućih komplikacija, doprinose boljem suočavanju sa bolešću i mogu da spreče pojavu disfunkcionalnih obrazaca mišljenja kod adolescenata sa hroničnim bolestima.