The School Environment as a Source of Somatic Problems in Adolescents

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Abstract: Somatic symptoms are a prevalent health problem in children and adolescents. The specific cause often remains unidentified in paediatrics and cases are therefore frequently assigned to psychological aetiology. The most common cause of somatic symptoms is stress which can arise from a variety of areas of adolescent life. One significant factor affecting the mental health and wellbeing of youth is their school environment. The link between somatic symptoms and school has thus far been studied mainly from the perspective of the impact of health problems on academic performance, attendance or relationships with schoolmates. However, we can assume that the school environment and its characteristics can equally be a source of stress for adolescents and thereby also the reason for the occurrence of somatic issues. The main aim of this study is to investigate the presence of somatic symptoms in adolescents and above all, to determine if they can be caused by factors such as attachment to school, school climate, feeling of safety at school, teacher support, and self-academic motivation. To examine the factors of the school environment and the presence of individual somatic symptoms, we used the scales of the Social and Health Assessment (SAHA) questionnaire. Amongst the 1,961 adolescents observed, the most frequent somatic symptom was unspecified aches or pains (65.4%) followed by headaches (59.3%) and rashes/other skin problems (46.8%). Linear regression analysis showed that all examined factors of the school environment significantly lead to the occurrence of somatic symptoms.

Keywords: *Somatic symptoms; school environment; adolescence.*

How to cite: Demuthova, S. (2019). The School Environment as a Source of Somatic Problems in Adolescents. *Revista Romaneasca pentru Educatie Multidimensionala*, 11(2), 59-71. doi:10.18662/rrem/117

1. Introduction

The school environment refers to various social, psychological, and physical characteristics of a school in terms of its physical surroundings as well as the overall atmosphere, relationships among students and staff/teachers, learning and teaching emphasis, values, norms or organizational structures (Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2010). The quality of a school environment affects various groups of people including students, teachers, and parents. Most studies naturally focus predominantly on the connection between a student's school environment and his/her behaviour or the experience of students, showing a close relationship between school situation and dropout rate (Andersen et al., 1982), bullying (Eliot, Cornell, Gregory, & Fan, 2010), discipline problems (Mattison & Aber, 2007), violence at school (Johnson, Burke, & Gielen, 2011) and/or academic achievement (MacNeil, Prater, & Busch, 2009).

The school environment makes an impact not only on the life and behaviour of students during classes, it is also a factor that affects wider psychological issues such as a student's self-esteem (Cribb & Haase, 2016), social roles or popularity (Wright & Cowen, 1982), expectations about the future (Stoddard & Pierce, 2015), etc. In general, the quality of a school environment determines the quality of emotional (Kidger, Araya, Donovan, & Gunnell 2012), mental (Galanti et al., 2016; Lester & Cross, 2015), as well as somatic health (Gådin & Hammarström, 2003) of adolescents. A bad or stressful environment can thus be reflected psychologically, but also on the level of somatic health. Especially in children and adolescents, somatic symptoms are a very common physical response to stress. These symptoms appear in personal reports of physical symptoms such as headaches, abdominal or muscle pain (Cerutti et al., 2017). Paediatricians are often faced with physical symptoms lacking a clear medical cause. In the past, they were usually defined as medically unexplained symptoms or functional somatic symptoms (Cerutti et al., 2016). The rising occurrence and persistence until the age of adulthood (Bohman et al., 2018), but especially the fact that they significantly decrease one's quality of life, have resulted in a proposal to include a new category of "Somatic Symptom and Other Related Disorders" within the Diagnostic and Statistical Manual of Mental Disorders (DSM-5, 2013). Regardless of the formal definition, these health issues have been occurring in children and adolescents rather frequently for decades and their origin is often too difficult for doctors to determine explicitly because it stems from psychological aetiology.

The correlation between somatic symptoms and school factors has been studied mainly from the perspective of the presence of indicators in students and their subsequent influence on performance and relationships at school. In this respect, it is evident that somatic symptoms have a negative impact on attendance (Heimann et al., 2018), achievement (Cerutti et al., 2016), peer relations (Campo & Fritsch, 1994), etc. However, considering children and adolescents spend the majority of their day at school and with their schoolmates, the school presents an important framework for self-esteem and social status; the class is a significant social group which determines roles and popularity, school achievements have an impact on future plans and on the satisfaction of their parents. In this way, one can expect that the school environment is an enormous stress factor and a potential source of somatic symptoms. This assumption is supported by several foreign studies which point to the fact that the school climate and environment (e.g. school-peer stress – Hart, Hodgkinson, Belcher, Hyman, & Cooley-Strickland, 2012; help from teachers – Løhre, Lydersen, & Vatten, 2010; bullying – Fekkes, Pijpers, Fredriks, Vogels, & Verloove-Vanhorick, 2006; subordinative position in the class hierarchy – Halpern, Jutte, Colby, & Boyce, 2015...) could be related to the occurrence of somatic symptoms in children and adolescents.

2. Objective

This study aims to investigate the prevalence of somatic symptoms in adolescents with an emphasis on the possible source of somatic symptoms being the quality of school environment.

3. Method

To quantify the school environment and somatic symptoms, the Social and Health Assessment (SAHA) questionnaire (Weissberg et al., 1991; Ruchkin, Schwab-Stone, & Vermeiren, 2004) has been used. The SAHA is a multiscale assessment of the risk and protective factors in the social and health development of school-age youth. It consists of various, validated scales (Barbot et al., 2012) with evidence of strong psychometric properties across several countries (Schwab-Stone et al., 1995; Vermeiren, Schwab-Stone, Deboutte, Leckman, & Ruchkin, 2003) including Slovakia (Selecká, Václaviková, Blatný, & Hrdlička, 2017; Selecká & Václaviková, 2017; Rojčková 2017; Mičková, Blatný, & Hrdlička 2018). The Slovak edition of the SAHA questionnaire was produced using established translation guidelines by two experts followed by a reverse translation and comparison with the

original by an independent expert. The study was conducted in various public schools across a range of different school types in Slovakia and was approved by administrative school boards. Before starting the assessment, students were informed by trained administrators about the study and its confidentiality with an option to refuse participation. The questionnaire was completed in class.

Characteristics of the school environment were graded from SAHA according to subjects' reactions to various statements on a four-point scale: absolutely not true – usually not true – usually true – absolutely true. The category *Positive Attachment to School* was addressed by five statements, i.e. “most mornings I look forward to going to school”; *Negative School Climate* by seven, i.e. “teachers often shout at students”; *Feeling of Safety* by five, i.e. “I feel safe in front of our school”; *Teacher Support* by eight, i.e. “most of my teachers notice when I am doing a good job and let me know about it”; and *Self-Academic Motivation* by six statements, i.e. “it is important to me to be considered a bright student by my teachers”.

Somatic symptoms were measured by the SAHA Somatization Scale which consists of eleven statements with the ability to denote a specific symptom or subjective health condition on a three-point scale: not true – somewhat true – certainly true. Somatic symptoms were assessed based on subjective experience in the past 30 days. From eleven statements, seven referred to specific somatic problems, i.e. “I had headaches”, “I had stomach aches”, or “I had nausea”. For the purposes of the prevalence of somatic symptoms in the sample, reply choices were dichotomised into either not experiencing specific symptom, “not true”, or experiencing “somewhat true”, “certainly true”.

4. Participants

From a total sample of 2,170 participants, 209 (9.63%) were excluded due to incomplete or incorrectly completed questionnaires. Participants included 1,961 Slovak adolescents (62.6% females, 37.4% males) from 10 to 19 years (mean age = 16.8 years, st. dev. = 1.481) attending primary and secondary education. All participants were in the public school system and were recruited from classes randomly selected from various public schools representing all different school types in Slovakia.

5. Results

Frequency analysis of the occurrence of individual somatic symptoms showed that the most common health issue in adolescents is

unspecified aches or pains, followed by headaches (see Table 1). Rashes or other skin problems also ranked high, the occurrence of which was very similar to stomach aches.

Table 1. The occurrence of specific somatic symptoms

Specific somatic symptom During last 30 days:	N	%
Headaches	1,163	59.3
Stomach aches	914	46.6
Aches or pains	1,283	65.4
Nausea	574	29.3
Problems with eyes	571	29.1
Rashes or other skin problems	917	46.8
Vomiting	298	15.2

In the next stage, we looked at the relationship between the degree of somatic symptoms (the 11-point scale – Cronbach's Alpha = .832) and individual factors of the school environment: Positive Attachment to School (.794), Negative School Climate (.734), Feeling of Safety (.817), Teacher Support (.718), and Self-Academic Motivation (.731). As all the variables observed were distributed normally, the Pearson correlation was used. The correlation analysis showed a statistically significant parallel between somatic symptoms and all elements of the school environment (see Table 2).

Table 2. Correlation between the degree of somatic symptoms and individual school environment factors

School environment factors:	Somatic symptoms:	
Positive Attachment to School	Pearson Correlation	-.165**
	Sig. (2-tailed)	.000
	N	1227
Negative School Climate	Pearson Correlation	.146**
	Sig. (2-tailed)	.000
	N	1227
Feeling of Safety	Pearson Correlation	-.209**
	Sig. (2-tailed)	.000
	N	1227
Teacher Support	Pearson Correlation	-.154**
	Sig. (2-tailed)	.000
	N	1227
Academic Self-Motivation	Pearson Correlation	-.066*

	Sig. (2-tailed)	.021
	N	1227

Note: * correlation significant on the level $p < .05$;

** correlation significant on the level $p < .005$

Following the objective of the study, we used linear regression analysis to determine if we can identify the source of somatic symptoms amongst the factors of school environment and possibly specify each of them. Table 3 shows that all observed factors of the school environment significantly contribute to the occurrence of somatic symptoms in adolescents. Among the important protective factors of the occurrence of somatic symptoms are: Positive Attachment to School, followed by Feeling of Safety and Teacher Support. The risk factors are: Self-Academic Motivation and Negative School Climate.

Table 3. Regression analysis of the impact of school environment on somatic symptoms

School environment factors:	(ANOVA: $F = 18.166$; sig. = 0.000)		
	Beta	T	Sig.
(constant)	19.851	19.672	.000
Positive Attachment to School	-.113	-4.252	.000
Feeling of Safety	-.109	-4.586	.000
Self-Academic Motivation	.092	3.552	.000
Negative School Climate	.065	2.734	.006
Teacher Support	-.056	-2.115	.035

6. Discussion

The most frequently cited somatic symptom among adolescents was unspecified aches and pains. This could be expected as this category can also include other, more specific symptoms – e.g. headaches or stomach aches. In the sample observed, skin problems were relatively common and these, as opposed to headaches, stomach aches and nausea, are very difficult to falsify. Nevertheless, as many as 46.8% of participants indicated such issues. The occurrence of headaches (59.3%) and stomach aches (46.6%) were similar within our sample to comparable studies conducted abroad. Hart, Hodgkinson, Belcher, Hyman, and Cooley-Strickland noted the prevalence of headaches at 66.5 % and stomach aches at 62.6 %, however, the average age of their sample was lower (9.6 years). In fact, age is negatively associated with somatic symptoms reported by children (Hart, Hodgkinson, Belcher, Hyman, & Cooley-Strickland, 2012). Also, school support becomes

increasingly important and acts as a buffer against health problems in older students (Romero-Acosta et al., 2013). Zhang, Zhang, Zhu, Du and Zhang (2015) observed in Chinese children and adolescents a prevalence of 35.5% stomach aches, 33.4% headaches, and 19.7 % nausea, which is around 10% lower than our tested sample. A slightly lower prevalence compared to our results was found by Romero-Acosta et al. (2013). In their Spanish sample, 48.3% of children and adolescents reported headaches and 38.8% stomach aches.

Regression analysis revealed that the source of somatic symptoms can be identified in elements of the school environment in which adolescents spend a significant portion of their day. Numerous studies have noted a correlation between the occurrence of somatic symptoms and school environment (see e.g. Hart, Hodgkinson, Belcher, Hyman, & Cooley-Strickland, 2012; Løhre, Lydersen, & Vatten, 2010; Fekkes, Pijpers, Fredriks, Vogels, & Verloove-Vanhorick, 2006), however, only a few of them observed the possible causality of these relationships. Even if they focused predominantly on the consequences of somatic symptoms; more missed classes, worse school performance, and such (Heimann et al., 2018; Cerutti et al., 2016). Yet for adolescents, the atmosphere at school (relationships with peers, teachers, the style of education, etc.) and their attitude to school and to their own education are such important factors that they influence not only their academic performance, but their entire psyche and somatic health. Bad conditions at school or failures in education can thus become the source of somatic issues. This assumption was fully confirmed within the sample of adolescents studied by us – all school environment factors observed significantly contributed to the self-reported somatic symptoms.

The strongest predictor of somatic symptoms from among the observed factors was Positive Attachment to School (Beta= -.113). In the questionnaire, SAHA evaluates the general attitude of students towards school using statements such as: “I like school”, “When I am at school, I would rather be someplace else” (reverse), and “Most mornings I look forward to going to school”. We can assume that this is a generalized attitude reflecting also other observed categories such as school climate or feeling of safety, and could therefore play a decisive role in the aetiology. In the ranking of importance of influence, the factor Positive Attachment to School was followed by Feeling of Safety, which included entries like: “I feel safe on my way to school”, “I feel safe during activities organized by our school outside of classes” or “Our school respects students of different nationalities and race”. A strong predictive effect of this factor highlights the

fact that a threat to one's safety or feeling of possible risks in this area puts pressure on individuals, manifested through somatic symptoms.

The first two factors point to sources of somatic symptoms from an external environment. The third factor, however, comes from the mind-set of an individual – the category Self-Academic Motivation turned out to be the third strongest predictor which speaks about the attitude towards and the responsibility for academic duties. Statements such as: “It is important to me to get at least a B average this year”, “It is important to me to be considered a bright student by my teachers”, “I can’t wait to quit school” (reverse). This correlation with an occurrence of somatic symptoms shows that the more important the academic results are for an adolescent, the higher the chance of suffering from symptoms. One of the reasons for this can be the strong result-oriented attitude of academically motivated students, which puts pressure on a student to achieve the best possible results, increases stress during exams and intensifies the feeling of disappointment in the case of failure. These factors do not contribute to psychological wellbeing and therefore can consequently increase the indication of somatic problems.

The final two factors that influence the occurrence of somatic symptoms in adolescents are Negative School Climate and Teacher Support. These elements point to the fact that for adolescents, not only direct bonds to their schoolmates or academic performance play an important role in their school environment, but they respond sensitively to broader factors too. The feeling they have at school depends on the overall atmosphere, i.e. “Teachers often shout at students”, as well as in the way teachers interact with their students, i.e. “Teachers don’t often take time to give individual attention”.

With regard to the previous findings, we can underscore that the school environment is certainly an important factor influencing the mental wellbeing of students and has a great impact on the incidence of somatic symptoms. It seems that chronically mentioned issues like bullying or academic failure are not the only factors leading to mental health issues in adolescents. There is a much broader range of influences that arise from the school setting. This draws the attention to possible intervention and the improvement of school conditions leading to a reduction of somatic symptoms. The results of our study also show a significant positive connection between academic self-motivation and the occurrence of somatic symptoms, which creates an impression that those motivated, and perhaps achieving better results, will suffer from somatization more. This certainly deviates from the deep-rooted belief that it is mostly children struggling in

academics - those who are not successful at school and have worse results - who somatise more often.

When interpreting these results, it is important to mention the limits of our study. The generalization of findings is problematic in the age of early adolescence, since participants who are 10-13 years old (to distinguish the adolescent age see e.g. Macek, 2003), comprised only 3.9% of the sample. As some studies highlight the fact that the occurrence of somatic symptoms correlates significantly negatively with age (See e.g. Hart, Hodgkinson, Belcher, Hyman, & Cooley-Strickland, 2012), we can expect that if the representation of participants in early adolescence had been similar to that of participants in higher age categories, the frequency of somatic symptoms would have been higher. We can also question whether a lower average age could have resulted into a change in the order of importance of specific school environment factors. Developmental perspective points to the fact that the meaning and importance of peer relations or academic motivation vary across the adolescent period.

A second limitation lies in the methodology that was used for data collection. This study relied on self-reports without the ability to check the accuracy of information provided by participants. However, the majority of questionnaires commonly used in psychological research encounter this problem. What is also questionable is the ability of younger children to identify the real source of mental problems and whether there is no mutual interference - in our case whether a child can be taking problems from his/her home environment to school and identify them with relation to school, (e.g. antipathy towards going to school as an unconscious response to fear from being separated from family). In this regard, it would be certainly useful to observe how dominant the predictive force of school environment factors is in the occurrence of somatic symptoms in children and adolescents, in comparison to other factors, (e.g. family environment or dimensions of personality). With a wider range of possible causes, other factors might prove to play a role, for instance the age or gender of participants. These remarks suggest further studies that could not only include a broader spectrum of potential causes of occurrence of somatic symptoms in adolescents, but also examine their mutual relationships or moderating effect.

Acknowledgement

This work was supported by the Slovak Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic and Slovak Academy of Sciences under the contract No. VEGA 1/0042/17.

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