The European Journal of Public Health, Vol. 27, No. 3, 501–506

doi:10.1093/eurpub/ckw201 Advance Access published on 3 November 2016

Is risk-taking behaviour more prevalent among adolescents with learning disabilities?

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Background: Reports from schools indicate that adolescents with learning disabilities (LD) frequently show risk-taking behaviour (RTB), but evidence is lacking. The aim of the study was to assess the associations between LD status and RTBs among Slovak adolescents and to explore whether family affluence and family composition have a moderating or mediating role in these associations. **Methods:** Data from the Slovak national HBSC study 2014 were analyzed. The sample comprised 1549 15-year-old adolescents (mean age: 15.4; 52.5% boys). RTBs were defined as early sexual experience, truancy, fighting, bullying, early smoking initiation and drunkenness. The associations between LD status and RTBs were assessed using binary logistic regression; the mediating as well as moderating role of family affluence and family composition was explored as well. **Results:** Adolescents with LD are two times more likely to be engaged in early sexual experiences (OR 2.39; 95% CI 1.45–3.95), fighting (OR 1.72; 95% CI 1.01–2.95) and bullying (OR 2.08; 95% CI 1.26–3.44), but not in early smoking initiation, drunkenness or truancy. Family affluence and family composition did not moderate or mediate these associations. **Conclusions:** Adolescents with LD are at high risk of early sexual experiences, fighting and bullying but not of smoking initiation, drunkenness or truancy. Non-intact and poor families do not increase the risks associated with LD status of adolescents; however, in these families adolescents with LD are more prevalent.

Introduction

Learning disabilities (LD) are among the most frequently diagnosed developmental disorders in school-aged children.[1] According to the Individuals with Disabilities Education Act[2] LD is 'a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell or do mathematical calculations. Such term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia and developmental aphasia. Such term does not include a learning problem that is primarily the result of visual, hearing or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage'.[2]

The prevalence of adolescents with LD varies across European and non-European countries, from 5% in the USA,[1] 10% in Germany[3] up to 20% in Australia.[4,5] In the Slovak Republic, 3% of school-aged children within the educational system are diagnosed with moderate or severe LD.[6] These numbers represent children and adolescents with formally identified LD. It is assumed that the real prevalence of children and adolescents with unidentified LD might be much higher,[1] as in many countries the prevalence is not properly monitored. However, it should also be noted that LD status might be seen as continuum, making the cut-off for LD status somewhat arbitrary, reflecting the use of varying criteria for its identification.[7,8]

Adolescents with LD have been shown to be more engaged in a wide range of risk-taking behaviours (RTBs).[9–14] RTBs are often regarded as normative behaviours in adolescence and may include alcohol or drug use, delinquency, aggression or sexual activity.[11] The majority of the studies has identified a potentially higher level of risk for engagement in RTBs among adolescents with LD compared with adolescents without LD.[15–17] These studies have shown LD status of adolescents to be associated with early sexual experience,[11,18] truancy,[19] aggressive behavior[11,19–21] and alcohol and drug use.[11,19,21–24] However, other studies have not shown adolescents with LD more likely to be engaged in RTBs, such as truancy or early sexual behaviour, than adolescents without LD.[11,19] This may be due to other variables playing a role in the relationship between LD and RTBs in adolescence, for example, peer status or family functioning.[25,26]

Existing studies have further indicated that less affluent families as well as non-intact families might be a more vulnerable social context for developing both RTB and LD status.[25–28] Thus, the aim of the study was to assess the associations between LD status and RTBs (early sexual experience, truancy, fighting, bullying, early smoking initiation and drunkenness) among Slovak adolescents and to explore whether family affluence and family composition moderated or mediated these associations.

Methods

Sample and procedure

Data from the Health Behaviour in School-aged Children (HBSC) study conducted in 2014 in Slovakia were used. Each country has to follow standardized international research protocol to ensure consistency in survey instruments, data collection and processing. Questions are subject to validation studies and piloting at national and international levels, with the outcomes of these studies often being published.[29] To obtain a representative sample, a two-step sampling was performed. In the first step, 151 larger and smaller elementary schools located in rural as well as in urban areas from all regions of Slovakia were asked to participate. These were randomly selected from a list of all eligible schools in Slovakia obtained from the Slovak Institute of Information and Prognosis for Education. In the end, 130 schools took part in the survey (response rate: 86.1%). In the second step, data from 10 179 adolescents from the 5th to 9th grades (response rate: 78.8%) were obtained. Only 15-year-old adolescents from the 8th and 9th grades were asked questions about sexual behaviour. This represents a final sample of 1549 adolescents aged 15 years (mean age: 15.39; 52.5% boys).

The study was approved by the Ethics Committee of the Medical Faculty at the P. J. Safarik University in Kosice. Parents were informed about the study via the school administration and could opt out if they disagreed with their child's participation. Participation in the study was fully voluntary and anonymous, with no explicit incentives provided for participation. Questionnaires were administered by trained research assistants in the absence of a teacher during regular class time.

Measures

Learning disability status. Respondents were asked (yes/no) whether they have been diagnosed with disability (dyslexia, dysgraphia, orthography and dyscalculia) by a doctor. Those who reported 'yes' were categorised as 'adolescent with LD'.

Sexual intercourse. Respondents were asked (yes/no) whether they had ever had sexual intercourse (for better understanding, other colloquial terms were used as an example of fully penetrative sexual intercourse, such as 'making love', 'having sex' or 'going all the way'). Those who reported 'yes' were categorised as 'adolescent with early sexual experience'.

Truancy. Respondents were asked how many times they had stayed away from school for at least a whole day without a legitimate excuse in the last 12 months, with possible responses: never/one or two times/three times or more.[30] Those who reported skipping school at least one time were categorised as 'truants'.

Fighting. Respondents were asked how many times they had been in a physical fight during the past 12 months, with possible responses: I have not been in a physical fight in the past 12 months/1 time/2 times/3 times/4 or more times.[31,32] Those who reported being in a physical fight at least three times were categorised as 'frequent fighters'.

Bullying. Respondents were asked how often have they taken part in bullying other student(s) at school in the past couple of months, with possible responses: I have not bullied other student(s) at school in the past couple of months/it has only happened one or two times/two times or three times a month/about one time a week/several times a week. The question was preceded by a description of bullying. Those who reported bullying others at least two times a month were categorised as 'bullied others'.

Early smoking initiation. Respondents were asked at what age they first smoked a cigarette (more than a puff), with possible responses: never/11 years old or less/12 years old/13 years old/14 years old/15 years old/16 years or older. Those who reported having smoked before age 13 were categorised as 'smoked before age 13'.

Drunkenness. Respondents were asked on how many occasions they had been drunk in the previous 30 days (0/1–2/3–5/6–9/10–19/20–39/40 and more). Those who reported being drunk at least one time were categorised as 'drunk'.

Family affluence. Family affluence was measured using the Family Affluence Scale III (FAS III), which consists of six questions: 'Does your family own a car, van or truck' (No/Yes, one/Yes, two or more)? 'Do you have your own bedroom for yourself' (No/Yes)? 'How many computers does your family own' (None/One/Two/More than two)? 'How many bathrooms (room with a bath/shower or both) are in your home' (None/One/Two/More than two)? 'Does your family have a dishwasher at home' (No/Yes)? 'How many times did you and your family travel out of Slovakia for a holiday/vacation last year?' (Not at all/One time/Two times/More than two times)? A validation study for FAS III was performed in 2012 in Denmark, Italy, Norway, Poland, Romania, Scotland, Greenland and Slovakia.[33] We converted the FAS summary scores into a final score, which has a normal distribution and a range from 0 to 1. We then created tertile groups of low (0–0.333), medium (0.334–0.666) and high (0.667–1) socioeconomic position.[34]

Family composition. Respondents were asked about the family in which they live, with possible responses: complete own (both parents are your own)/complete mixed (one of the parents is not your own)/incomplete (you are living with mother or father only). In order to focus not only on the completeness of the family, but also on the structure as well, this question was dichotomised to intact (complete own) and non-intact families (complete mixed and incomplete).

Statistical analyses

In the first step, the frequencies were computed for gender, family affluence, family composition and each of the RTBs for the total sample and separately for adolescents with and without LD. The statistical significance of differences by LD status was assessed using χ^2 test of independence. Second, the associations between LD status and early sexual experience, truancy, fighting, bullying, early smoking initiation and drunkenness were assessed using binary logistic regression models. Model 1 tested the crude association between LD status, family affluence, family composition and different types of RTB. Model 2 assessed mediation via family affluence and family composition, with adjustment for LD status, family affluence and family composition (Model 2). The degree of reduction of the odds ratios (ORs) was computed $[(OR_{[crude]} - OR_{[adjusted]})/(OR_{[crude]} - 1) \times 100\%]$. Finally, moderation by family affluence and family composition was assessed by the statistical significance of the interaction of these variables with LD status regarding these outcomes. All models were adjusted for gender as a potential confounder and performed using SPSS 21.0 for Windows.

Results

Adolescents with LD represented almost 8% of our sample and, based on χ^2 tests of independence, were significantly more often boys (11 vs. 4%) and from non-intact families (10 vs. 6%). Based on descriptive statistics, more than 20% of the adolescents with LD reported bullying, fighting, early smoking initiation and drunkenness and 3 in 10 reported early sexual experience and truancy (Table 1).

The presence of LD in adolescents was not associated with truancy, early smoking initiation or drunkenness. However, adolescents with LD were approximately two times more likely to report early sexual experience, fighting and bullying in comparison with their peers without LD (Table 2, Model 1). These associations remained significant after adjustment for gender, family affluence and family composition (Table 2, Model 2).

Mediation was not confirmed as no significant changes were found in ORs after the associations between LD status of adolescents

Table 1 Gender, family affluence, family composition and RTBs overall and stratified by learning disability status (Slovakia 2014, $n = 1517$, mean age: 15.4 years)

	Total		Adolescents with LD		Adolescents without LD		
	n	%	*n*	%	*n*	%	*P* values[a]
Gender							0.001
Girls	723	47.7	32	27.4	691	49.4	
Boys	794	52.3	85	72.6	709	50.6	
Family affluence							0.195
High	369	28.0	20	22.0	349	28.4	
Middle	370	28.1	23	25.3	347	28.3	
Low	579	43.9	48	52.7	531	43.3	
Family composition							0.020
Intact family	1186	80.3	77	72.0	1109	80.9	
Non-intact family	291	19.7	30	28.0	261	19.1	
RTB							
Early sexual experience	214	15.9	30	28.3	184	14.9	0.001
Truancy	397	26.7	35	32.1	362	26.3	0.113
Bullying	208	13.9	25	21.9	183	13.2	0.010
Fighting	191	12.9	25	22.9	166	12.1	0.002
Early smoking initiation	376	26.9	27	24.8	349	27.1	0.343
Drunkenness	264	18.3	24	22.2	240	18.0	0.502

[a] χ^2 test of independence was used for testing of possible statistical significance of differences between studied variables. Only valid percentages are presented; missing values *N* (%): LD 32 (2.1), gender 0 (0), family affluence 213 (13.8), family composition 50 (3.2), early sexual experience 186 (12.0), truancy 36 (2.3), bullying 29 (1.9), fighting 40 (2.6), early smoking initiation 127 (8.2), drunkenness 78 (5.0).

and RTBs were adjusted for family affluence and family composition. No significant interaction effects of LD status of adolescents with family affluence and family composition, respectively, on RTBs (results not shown) were found either, that is, no moderation.

Discussion

This study explored the associations between LD status and RTBs among Slovak adolescents and whether family affluence and family composition have a moderating or mediating role in these associations. Adolescents with LD were approximately two times more likely to report early sexual experience, fighting and bullying in comparison with their peers without LD. No significant association was found between the presence of LD in adolescents and truancy, early smoking initiation or drunkenness. We did not find a moderating or mediating effect of family affluence and family composition.

This study yielded inconsistent findings regarding the occurrence of RTBs in adolescents with LD. The prevalences of only some of the explored RTBs were higher in this specific group. This confirms the varying picture from previous studies. Some of them showed higher prevalences of risky sexual behaviour, aggressive behaviour, violent delinquency, and alcohol and drug use in adolescents with LD in comparison with their peers without LD.[11,18,19,21,23] In contrast, other studies did not show adolescents with LD to be more likely engaged in truancy and risky sexual behaviour than adolescents without LD.[11,19] Such a difference might be due to differences in the causal pathways leading to the various RTBs.

Considering the nature of particular RTB clusters, some 'RTBs' may be considered as a natural part of development in adolescence. Other RTBs are so serious that they go beyond the scope of what might be considered as a part of experimenting typical and normative for this period of life.[11] Regarding the first, presented study found, for example, no differences in the occurrence of early smoking initiation, drunkenness or truancy among adolescents with and without LD. This regards behaviours of a transient or experimental character and a fairly high prevalence (17–26%). Some authors have indicated these behaviours to also have some positive consequences, such as a learning experience, acceptance by and integration into a clique, and stabilisation of the acquired position.[35–38] Regarding the second type of RTB, early sexual experience as well as aggressive behaviour may be examples. They potentially have more serious consequences, such as injuries, adolescent pregnancy and sexually transmitted diseases. Fortunately were found to be less prevalent in our study. Early sexual experience as well as aggressive behaviour may be associated with higher impulsivity and less self-control, that is, be linked to a higher vulnerability in adolescents with LD.[21,39,40]

No moderating or mediating role of family affluence or family composition on the association between LD status of adolescents and RTBs was found. It seems that low affluent families and non-intact families, thus do not represent a more vulnerable social context for developing RTBs in children with LD. However, the prevalence of LD status is higher in adolescents from non-intact families implying that RTBs related to LD status can be found more frequently in such families. Previous research indicates that growing up in a single parent family is associated with a higher risk for alcohol use, adjustment problems and emotional and delinquent behaviour,[11,28] but this does not seem to reinforce the associations due to having LD.

Strengths and limitations

The strength of this study is that it covers relevant data from a representative sample of Slovak adolescents aged 15 years collected via the HBSC cross-sectional study. A limitation might be that a relatively low number of adolescents with LD was identified. Another limitation might be the cross-sectional design of our study itself, which did not allow us to explore causal pathways. Longitudinal research is needed for the latter. Next, relying fully on self-reporting might also be considered as a limitation. Self-report was also used to identify LD status of adolescents and RTBs, which may have led to some misclassification. Findings should thus be confirmed with use of other informants, for example, doctors, teachers or parents. In addition to that, it may be discussed whether a single occasion of smoking a single cigarette represents real smoking. However, previous research has extensively documented the predictive power of such a first puff for further smoking.[41–43] Finally, cross-national character of HBSC study does

Table 2 Associations between LD and early sexual experience, bullying, fighting, truancy, early smoking initiation and drunkenness

	Early sexual experience		Bullying	
	***n* = 1174**		***n* = 1300**	
	Model 1 OR (95% CI)	**Model 2 OR (95% CI)**	**Model 1 OR (95% CI)**	**Model 2 OR (95% CI)**
LD				
No	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Yes	2.26 (1.44–3.55)	2.39 (1.45–3.95)	1.84 (1.15–2.95)	2.08 (1.26–3.44)
Gender				
Girls	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Boys	1.33 (0.99–1.78)	1.27 (0.92–1.75)	1.82 (1.35–2.46)	1.89 (1.36–2.64)
Family affluence				
High	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Middle	0.52 (0.34–0.79)	0.50 (0.33–0.77)	1.17 (0.76–1.81)	1.16 (0.74–1.83)
Low	0.70 (0.50–1.00)	0.67 (0.47–0.96)	1.50 (1.02–2.21)	1.53 (1.02–2.28)
Family composition				
Intact	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Non-intact	1.76 (1.26–2.46)	1.53 (1.06–2.22)	1.42 (1.01–2.01)	1.37 (0.94–2.01)
	Fighting		**Truancy**	
	***N* = 1299**		***N* = 1300**	
	Model 1 OR (95% CI)	**Model 2 OR (95% CI)**	**Model 1 OR (95% CI)**	**Model 2 OR (95% CI)**
LD				
No	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Yes	2.17 (1.35–3.49)	1.72 (1.01–2.95)	1.33 (0.87–2.02)	1.34 (0.84–2.12)
Gender				
Girls	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Boys	3.35 (2.37–4.73)	3.19 (2.20–4.60)	1.06 (0.84–1.33)	1.09 (0.85–1.40)
Family affluence				
High	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Middle	0.86 (0.56–1.33)	0.85 (0.55–1.33)	0.99 (0.72–1.38)	0.97 (0.69–1.35)
Low	0.99 (0.68–1.45)	0.98 (0.66–1.46)	1.10 (0.82–1.47)	1.06 (0.79–1.43)
Family composition				
Intact	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Non-intact	1.34 (0.94–1.92)	1.13 (0.75–1.71)	1.46 (1.11–1.93)	1.38 (1.03–1.87)
	Early smoking initiation		**Drunkenness**	
	***N* = 1206**		***N* = 1251**	
	Model 1 OR (95% CI)	**Model 2 OR (95% CI)**	**Model 1 OR (95% CI)**	**Model 2 OR (95% CI)**
LD				
No	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Yes	0.89 (0.56–1.39)	0.76 (0.45–1.28)	1.30 (0.81–2.10)	1.13 (0.65–1.97)
Gender				
Girls	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Boys	1.10 (0.87–1.40)	1.20 (0.93–1.55)	1.26 (0.97–1.64)	1.24 (0.93–1.67)
Family affluence				
High	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Middle	0.91 (0.65–1.27)	0.92 (0.65–1.29)	0.90 (0.61–1.31)	0.93 (0.63–1.37)
Low	1.02 (0.75–1.37)	1.01 (0.75–1.38)	1.01 (0.72–1.41)	1.01 (0.71–1.43)
Family composition				
Intact	1 (reference)	1 (reference)	1 (reference)	1 (reference)
Non-intact	1.63 (1.23–2.17)	1.47 (1.08–2.00)	1.46 (1.06–2.02)	1.34 (0.94–1.91)

Model 1: crude effect of LD and sociodemographic characteristics on different types of RTB.
Model 2: effect of LD and sociodemographic characteristics on different types of RTB adjusted for gender, FAS III and family composition.

not allow a multi-item measurement of the explored factors and an in-depth exploration of the cultural specificities of each country.

Implications

Intervention and prevention programmes should help parents, teachers and other adults in contact with these children to become aware of the higher risk of particular RTBs in adolescents with LD and to prevent them or to manage these RTBs. Despite the shortage of evidence, we might expect, based on the reports from, for example, psychotherapists, counsellors and social workers, that children raised in an incomplete family are more vulnerable to develop behavioural problems. Further research should consider family structure, the timing of the family structure change and conditions preceding a family structure change and relationships with separated parent. In addition, future research might also focus on other potentially relevant variables, such as severity of LD status, co-morbidities like ADHD or developmental disorders, peer status and other aspects of family functioning.

Conclusions

This study shows that adolescents with LD are at high risk of early sexual experiences and aggressive behaviours but not of early

smoking initiation, drunkenness or truancy. However, adolescents with LD from non-intact and poor families are not at higher risk of particular RTBs as we expected.

Acknowledgements

This work was partially supported by the Research and Development Support Agency under Contract No. APVV-15-0012, and by the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic and the Slovak Academy of Sciences, Reg. No. 1/0981/15 and by the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic and the Slovak Academy of Sciences, Reg. No. 1/0895/14.

Funding

Conflicts of interest: None declared.

Key points

- Adolescents with LD are at high risk of early sexual experiences and aggressive behaviours but not of early smoking initiation, drunkenness and truancy.
- Adolescents with LD from non-intact and poor families are not at higher risk of particular RTBs, however, in these families, adolescents more frequently have LD.
- Intervention and prevention programs should help parents, teachers and other adults in contact with children with LD to become aware of their higher risk of particular RTBs and to prevent them or to deal with them.

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The European Journal of Public Health, Vol. 27, No. 3, 506–512

doi:10.1093/eurpub/ckw209 Advance Access published on 8 November 2016

Knowledge and attitudes towards the use of antibiotics in the paediatric age group: a multicenter survey in Italy

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Background: The misuse of antibiotics is one of the leading causes of antibiotic resistance. Paediatric patients are highly involved in this issue, as they are those who receive the largest amount of prescriptions of these drugs. Therefore, this study aimed to investigate the general knowledge regarding the use of antibiotics, as well as the attitudes related to the administration of these drugs to children, amongst parents of children in the paediatric age-group. **Methods**: In 2014, a multicentre cross-sectional study was conducted amongst parents of children aged 0–14. A questionnaire made up of 33 items was administered in waiting rooms of outpatient departments. Multivariable logistic regression models were performed, in order to assess the potential predictors of a better knowledge about antibiotics. **Results**: A total of 1247 parents took part to the survey. Around 33% of the samples declared that antibiotics are useful for viral infections, 20.6% that antibiotics are useful for every kind of pain and inflammation, while 14% of the parents stated that they stop giving antibiotics to their children when they start feeling better. Multivariable models showed that males, unemployed and those with lower levels of education are less prone to answer correctly to the questions about antibiotics. **Conclusion**: The present study demonstrates that parents have a lack of knowledge regarding the use of antibiotics, which results in bad habits and inappropriate attitudes when it comes to giving antibiotics to their children. Attention should be particularly focused on disadvantaged parents.

Introduction

Antibiotic resistance is the resistance of a bacterium to an antibiotic that was originally effective for the treatment of the infections caused by it.[1] In recent years, this phenomenon has become a public health issue worldwide. According to the data of the 2011 European Commission report on antimicrobial resistance,[2] resistant bacteria infections cause around 25 000 deaths every year within the EU, leading to an increase of healthcare expenses and to productivity losses. One of the main causes of antibiotic resistance is the misuse of antibiotics in terms of self-prescriptions, incomplete therapies, missing doses, and re-use of leftover antibiotics.[3] These inappropriate practices also have implications regarding the administration of antibiotics to the paediatric population. This is even more alarming, considering that paediatric patients are the category of patients who receive the largest amount of prescriptions of these drugs.[4] Ciofi degli Atti et al. e Nyquist et al. found out that more than 40% of paediatric patients visited by physicians for respiratory infections receive antibiotics.[5,6] Moreover, a recent study conducted by Adam et al. showed that *Streptococcus Pneumoniae* and *Escherichia Coli*, resistant to the most common antibiotic drugs, were more frequently found in children than in adults.[7] In this context, the role of children's caregivers is crucial, as they are