Eur Child Adolesc Psychiatry (2011) 20:527–535
DOI 10.1007/s00787-011-0214-0

ORIGINAL CONTRIBUTION

Epidemiology of psychiatric disorders in very young children in a Romanian pediatric setting

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Received: 24 January 2011 / Accepted: 5 August 2011 / Published online: 25 August 2011

Abstract A growing literature demonstrates that early clinical intervention can reduce risks of adverse psychosocial outcomes. A first step necessary for developing early intervention services is to know the prevalence of clinical disorders, especially in systems that are rebuilding, such as Romania, where the mental health system was dismantled under Ceausescu. No epidemiologic studies have examined prevalence of psychiatric disorders in young children in Romania. The objective of this study was to determine the prevalence of psychiatric disorders in Romanian children 18–60 months in pediatric settings. Parents of 1,003 children 18–60 months in pediatric waiting rooms of two pediatric hospitals completed background information, the Child Behavior Checklist (CBCL). A subgroup over-sampled for high mental health problems were invited to participate in the Preschool Age Psychiatric Assessment. Rates of mental health problems were similar to the US norms on the CBCL. The weighted prevalence of psychiatric disorders in these children was 8.8%, with 5.4% with emotional disorders and 1.4% with behavioral disorders. Comorbidity occurred in nearly one-fourth of the children with a psychiatric disorder and children who met diagnostic criteria had more functional impairment than those without. Of children who met criteria for a psychiatric disorder, 10% of parents were concerned about their child's emotional or behavioral health. This study provides prevalence rates of psychiatric disorders in young Romanian children, clinical characteristic of the children and families that can guide developing system of care. Cultural differences in parental report of emotional and behavioral problems warrant further examination.

Keywords Early childhood · Mental health · Epidemiology · Preschool

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Introduction

Until recently, there was little recognition of mental health problems in very young children. A growing empirical base, however, suggests that very young children can suffer from clinically impairing psychiatric syndromes at rates similar to those in older children [5, 9, 16, 31, 37, 42, 50]. For major categories of psychiatric disorders, findings support convergent validity and for some disorders, biological correlates have also been identified [36, 44, 51]. These early disorders are associated with impairment in multiple developmental domains including cognitive, social and emotional functioning [35, 50, 54]. Importantly, these patterns are not transient phases, but show persistence well beyond the early childhood years [6, 30, 32, 45]. Although more research into the clinical syndromes is necessary, current data highlight the need to understand the prevalence of these disorders, especially in communities in which

mental health services are undergoing revisions or rebuilding. This is particularly true in Romania, where the mental health system was significantly damaged under an oppressive political regime between 1945 and 1989 and is still quite limited [3, 21]. Understanding early childhood mental health needs in this redeveloping system can guide allocation of scarce psychiatric resources and inform workforce development. Building an infrastructure focused on early childhood and prevention can be a cost effective approach to reduce community mental health and social burdens [23].

Currently, there is little information about rates of psychiatric disorders in Romanian preschool children. One small study reported a prevalence rate of 17% in a community sample of 59 54-month-olds, of whom 13.4% had an internalizing disorder and 6.8% an externalizing disorder [53]. To the best of our knowledge, no other studies have examined rates of disorders in Romania or Central Europe in young children. Studies of young children in Western Europe have primarily used parent checklists or report of previous diagnosis to estimate rates of psychiatric problems in preschoolers, with generally similar findings as in US samples, although several studies have reported prevalence rates of clinical range parent report measures under 10% in preschoolers [19, 24, 26, 39, 46, 48]. In older Romanian children, parents endorsed similar rates of symptoms as US parents on a parent report checklist [40]. Internationally, parental psychopathology, parental education, and trauma are among the most important risk factors for child mental health problems [7, 24, 52].

In this study, we examined the prevalence of mental health problems, psychiatric disorders, comorbidity and impairment in 1,003 18- to 60-month-old Romanian children in a pediatric setting. We examined correlates of diagnoses and predicted that children with family psychiatric histories, lower levels of parental education, and past traumatic experiences would have higher rates of psychiatric diagnoses.

Methods

Study procedures

Parents of children aged 18–60 months were recruited in the pediatric waiting rooms of the Dr. Victor Gomoiu Children's Hospital and Marie Curie Children's Hospital in Bucharest, Romania. The pediatric waiting room serves as the outpatient pediatric clinic waiting area and triage area for the inpatient service. Parents who consented completed a brief demographic information form and the Child Behavior Checklist (CBCL) in a private room near the waiting room. Following the protocol of a previous study in Romania [53], parent report measures were administered verbally to standardize administration given the range of reading levels in parents. As is done in other epidemiologic studies to ensure adequate numbers of symptomatic participants [16], we over-sampled for children with higher scores on the CBCL, inviting parents whose children scored higher than a *T* score of 55 (equivalent to the top 33 percentile) on the Total Behavior Problem to complete the Preschool Age Psychiatric Assessment (PAPA). Additionally, one out of every five (selected by random number generator) of the children who had a *T* score of <55 were also recruited to complete the PAPA, (see Fig. 1). Interviews were completed in a mean of 12.9 days after the screening date.

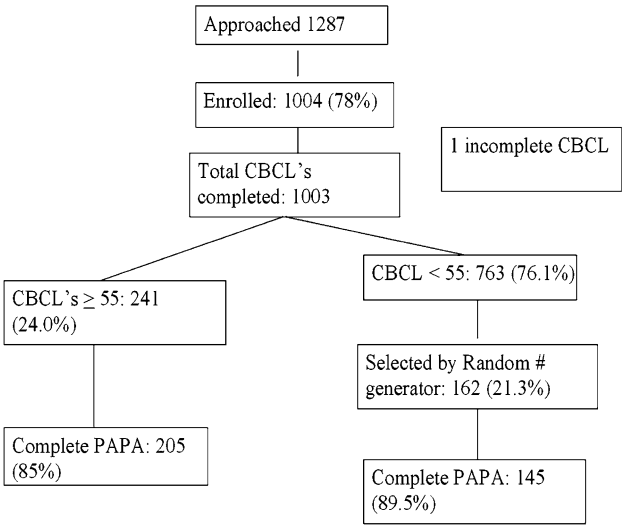

Fig. 1 Recruitment and retention

Participants

The participants were female primary caregivers. Rates of participation and retention are presented in Fig. 1. Of the 403 eligible to participate in the diagnostic phase of the study, 350 (87%) completed the PAPA. There was no difference in completion rates between high CBCL and low CBCL participants.

Table 1 presents demographics of the study population, including the total screened sample, the group who completed the PAPA, and those who were invited to complete the PAPA but who declined ("non-completers"). Completers differed from the non-completers only in age—children with completed psychiatric interviews were younger than those who did not.

Measures

All measures were translated into Romanian and back translated into English by a native Romanian speaker fluent in English and checked for accuracy.

Table 1 Demographics of the study population (unweighted)

	Entire sample (1,003)	PAPA sample (350)	Non-completers (54)
Mean age months (*M*, SD)	41.2 (11.1)	39.7 (10.9)*	43.4 (12.0)*
Maternal age (*M,* SD)	30.00 (5.1)	30.2 (4.8)	29.6 (6.6)
Paternal age (*M,* SD)	32.9 (5.8)	33.3 (5.4)	32.9 (7.7)
Girls *n* (%)	482 (48.2)	165 (47.1)	27 (50.0)
Ethnicity *n* (%)			
Romanian	924 (92.0)	326 (93.1)	45 (83.3)
Roma	54 (5.40)	15 (4.3)	2 (3.7)
Other/missing	26 (2.6)	8 (2.5)	7 (13.0)
Maternal education *n* (%)			
Less than HS	381 (38.1)	109 (31.2)	20 (37.0)
HS degree/some college	415 (41.5)	163 (46.6)	25 (46.3)
College or advanced degree	192 (19.2)	77 (22.0)	4 (7.4)
Paternal education* *n* (%)			
Less than HS	365 (36.5)	101 (28.8)	24 (44.4)
HS degree/some college	398 (39.8)	155 (44.3)	18 (33.4)
College or advanced degree	194 (19.4)	66 (21.7)	7 (13.0)
Child care arrangement *n* (%)			
Full time with parent	473 (47.1)	166 (46.5)	26 (51.1)
In home care	274 (27.3)	102 (28.6)	14 (27.5)
Out of home care	247 (26.6)	88 (24.7)	10 (19.6)
Weekly day care	6 (0.6)	1 (0.3)	1 (2.0)
Number of traumatic events			
0		152 (43.1)	
1		133 (37.9)	
2		54 (15.4)	
3		10 (2.8)	
4		2 (0.6)	
Positive maternal depression screen (PHQ-2) *n* (%)			
No	925 (92.3)	299 (85.2)	24 (77.4)
Yes	77 (7.7)	52 (14.8)	7 (22.6)
Family history of psychiatric disorder			
Yes	136 (13.5)	67 (18.8)	9 (18.0)
Referred to specialist for behavioral problem			
Yes	11 (1.1)	9 (2.2)	2 (4.0)

* Non-completers differ from PAPA sample $p \leq 0.05$

Child Behavior Checklist 1½–5

The CBCL is a well-established 100-item questionnaire for use in children 18–60 months [2]. It takes 10–15 min to complete and uses a 3-point Likert scale. The CBCL results provide *T* scores normed by age and gender. The CBCL has demonstrated extensive internal validity, test–retest reliability and convergent reliability. The validity of the CBCL 1½–5 has not specifically been tested in Romania, but the companion measure (CBCL 6–18) yields similar levels of symptoms in Romania as in the US [40] and the factor structure of the 1½–5 generally fits that of the US model [28].

Preschool Age Psychiatric Assessment

The PAPA is a comprehensive parent report psychiatric diagnostic interview for the preschool age that combines interviewer based and respondent based methods [16]. The measure takes approximately 100 min to administer and includes 25 diagnostic modules. The PAPA yields symptom counts, level of functional impairment, specific diagnoses, and composite disorders. Algorithms created for the English version of the PAPA were used to generate diagnoses and scale scores from the Romanian PAPA. The test–retest reliability of the PAPA is comparable to that of

structured psychiatric interviews used to assess older children and adults [15].

In this study, we examined rates of behavioral disorders (attention deficit hyperactivity disorder, oppositional defiant disorder, conduct disorder), emotional disorders (depressive disorders, specific anxiety disorders), sleep disorders, and reactive attachment disorder (RAD). In the post-traumatic stress disorder (PTSD) module, we also counted the number of DSM-IV level stressors the child had experienced. For most disorders, DSM-IV TR criteria were applied. However, developmentally sensitive, empirically derived criteria from the Research Diagnostic Criteria: Preschool Age were applied for RAD, depression, and PTSD [1]. In addition, following previously reported methodology, we required functional impairment in addition to the symptom criteria for specific phobias, separation anxiety disorder, and social phobia [15]. The PAPA generates impairment scale, which represents the number of life domains (0–30) in which the child's symptoms cause functional impairment, as previously described [15].

Background information

Parents completed a brief form that included child and parent age and education, child ethnicity, medical problems, family history of psychiatric disorders and violence exposure, child history of abuse, number of siblings, out of home child care attendance, parent concern (yes/no) about their child's emotional or behavioral development, and whether the child had been referred for treatment.

Consent and IRB approval

This study was approved by the Institutional Review Board at Tulane University School of Medicine and by the Head (Medical Director) of each hospital, who confirmed that all members of their staff involved in the study reviewed an IRB-approved presentation focused on ethical conduct of research.

Statistical analyses

Algorithms written in SAS 9.2 were used to create diagnoses variables [41]. Analyses were performed using SAS 9.2 and SPSS 17.0 [47]. Using the generalized estimating equations function of SAS PROC GENMOD, we computed weighted analyses from the whole sample to correct for the sampling scheme to derive unbiased estimates of reliability for the Romanian pediatric population. Using weighted prevalence analyses, we examined demographic correlates of psychiatric diagnoses. *T* tests were applied to examine differences among continuous variables and Chi-square analyses for categorical variables [47]. All prevalence data are presented using weighed correction for sampling unless otherwise stated.

Results

Mental health problems

In the total sample, the mean Total Problems scale score on the CBCL was 49.1 with a standard deviation of 8.6, similar to reference norms on US and other European samples [2]. The internalizing and externalizing scale means were 49.3 (SD 9.0) and 50.1 (9.1), respectively. Scores on all three scales were normally distributed. On the Total Problems scale, 72 children (7.2%) had a *T* score of 63 or above, a mark that represents the top 8% of the normative sample in the US. Girls had lower externalizing scale *T* scores than boys (48.4 vs. 50.1, $t(1{,}001) = -3.0$, $p < 0.03$). Because the *T* score is based on US norms, this finding also suggests that Romanian girls had relatively lower levels of reported externalizing signs than seen in the US normative sample, for whom the mean *T* score is, by definition, 50.

Prevalence of psychiatric diagnoses

Table 2 presents the rates of psychiatric disorders. In this group, 8.8% of children met criteria for a psychiatric diagnosis of an emotional, behavioral, or attachment disorder. When sleep disorders were included, 10.4% met criteria for a psychiatric disorder. Children with psychiatric diagnosis were more impaired than those without (1.0 vs. 2.6, $t(63.5) = -3.5$, $p < 0.0001$).

Comorbidity

Comorbidity, that is meeting criteria for more than one disorder, was seen in 3.9% of the total weighted sample and 22.8% of children with at least one diagnosis (unweighted $n = 9$). Of these, four met criteria for two diagnoses, three for three diagnoses, and two for four diagnoses. Most common combinations were an emotional diagnosis (anxiety or depression) plus indiscriminate RAD ($n = 3$) or behavioral diagnosis (ADHD, ODD, CD) plus indiscriminate RAD. The number of diagnoses was associated with impairment ($r = 0.36$, $p \leq 0.001$).

Sub-threshold clinical syndromes and impairment

A substantial group of children had levels of clinical signs of disorders required for diagnosis but did not meet criteria because parents did not endorse impairment. This issue is

Table 2 Rates of psychiatric diagnoses

	Unweighted number (n)	Weighted prevalence (%)	Upper, lower 95% OR	Weighted prevalence girls ($n = 165$)	Weighted prevalence boys ($n = 185$)
MDD	3	0.2	0.08, 0.8	2	0
SAD	9	1.3	0.03, 1.3	8*	2*
GAD	12	2.5	0.9, 4.1	11	11
Selective mutism	2	0.2	0.04, 0.4	1	1
Specific phobia	2	0.3	0.08, 1.2	1	1
Social phobia	4	0.6	0.2, 1.7	4	1
PTSD	1	0.2	0.02, 1.1	1	0
ADHD	4	0.4		1	2
Oppositional defiant disorder	6	0.9	0.4, 2.1	0*	7*
Conduct disorder	2	0.2	0.02, 1.1	1	0
Reactive attachment disorder—inhibited	0	0		0	0
Reactive attachment disorder—disinhibited	13	2.0	1.1, 4.3	6	12
Sleep disorder	17	4.2	2.5, 7.7	33*	7*
Any depressive disorder	10	1.4	0.7, 2.7	7	4
Any anxiety disorder	25	4.5	3.0, 7.4	22	16
Any emotional disorder	30	5.4	3.5, 8.2	18	15
Any behavioral disorder	10	1.4	0.7, 2.8	2	8
Emotional, behavioral, or attachment disorder	45	8.8	6.3, 12.4	30	14
All disorders including sleep	61	10.5	6.5, 16.9	60	52

* Gender difference $p \leq 0.05$

most prominent in behavioral disorders, which require functional impairment for the diagnosis. Of the children who met at least six hyperactive or inattentive criteria for ADHD, 66.7% (unweighted $n = 15$) had no reported functional impairment. Overall, only 30% of children who had sufficient number of symptoms to meet diagnostic criteria were functionally impaired by parent report.

There also appeared to be patterns of sub-threshold clinical disorders, in which a substantial proportion of children with one fewer criterion than required showed functional impairment. For children with three signs of ODD, 50% (unweighted $n = 6$) were impaired and 20% (unweighted $n = 10$) of those with two clinical signs of GAD were impaired.

Demographic correlates

Child characteristics

The mean age of children who met criteria for a psychiatric diagnosis in this study was slightly lower than those who did not (36.2 vs. 39.3 months, $t(74.9) = 2.4$, $p \leq 0.02$). There was no association between gender and diagnosis ($\chi^2(1) = 2.0$, NS). Using weighted analyses, 5.6% of girls and 7.6% of boys met criteria for at least one psychiatric diagnosis. However, girls were more likely to meet criteria for separation anxiety disorder (1.7 vs. 4%, $\chi^2(1) = 4.5$, $p \leq 0.03$) and had higher rates of sleep disturbances than boys (7.1 vs. 1.0%; $\chi^2(1) = 23.6$, $p \leq 0.001$). Boys met criteria for ODD at higher rates than girls (1.3 vs. 0%; Fisher's exact test $\leq$0.017) and had more signs of ADHD than girls (1.4 vs. 1.1; $t(987) = -2.3$, $p \leq 0.03$).

Children's potentially traumatic life experiences were associated with psychiatric diagnosis. Children with a diagnosis had experienced more such events than those without a diagnosis (1.0 vs. 0.6 $t(936) = 4.1$, $p \leq 0.001$). Of children with a diagnosis, 72.5% (unweighted $n = 39$) had experienced at least one potentially traumatic event, compared with 46.7% of those without a diagnosis ($\chi^2(4) = 16.8$, $p \leq 0.002$).

Parent reported early medical problems including pregnancy difficulties, colic, and having a medical problem (predominantly asthma, febrile seizures, and congenital malformation) were all associated with having a diagnosis as well ($\chi^2(1) = 22$, $p \leq 0.001$; $\chi^2(1) = 10.7$, $p \leq 0.001$; $\chi^2(1) = 6.1$, $p \leq 0.05$, respectively). Interestingly, a history of colic was reported in nearly half of the children with a diagnosis.

Parent characteristics

There was no association with parent age or maternal education level and child psychiatric disorder. However, lower paternal education level was associated with child

psychiatric disorder ($t(62.8) = 4.0$, $p \leq 0.001$) and higher family income was negatively associated with meeting criteria of a psychiatric diagnoses ($t(85.6) = -5.4$, $p \leq 0.001$). As predicted, family history of psychiatric disorder was also associated with diagnosis (25 vs. 10.0%, $\chi^2(1) = 10.7$, $p \leq 0.001$). Although parental concern about the child's emotional well being was associated with the presence of a psychiatric diagnosis ($\chi^2(1) = 6.2$, $p \leq 0.02$), only 10% (7/66) of the parents of children who met criteria for a psychiatric diagnosis reported that they were concerned.

Discussion

This is the first large study to examine rates of psychiatric disorders in very young children in a Romanian pediatric setting. We used a reliable, structured psychiatric interview to elicit symptoms and employed methodology used in other major child psychiatric epidemiologic studies [10, 16]. The mean scores on the CBCL scores suggest that the population had similar levels of parent-reported mental health symptoms as children in the US general population.

In this study, 8.8% of children met diagnostic criteria for a major psychiatric disorder, a group that included anxiety disorders, mood disorders, disruptive behavior disorders, and reactive attachment disorder. Despite the similar scores on the CBCL, the rates of psychiatric disorders in this study appeared somewhat lower than those in US preschool populations, where 12.1% of children met criteria for a diagnosis [15], although similar to rates reported in a study in Germany which used the Strengths and Difficulties Questionnaire, which closely approximates prevalence of diagnoses [22, 39]. The lower rates of psychiatric disorders in young children is consistent with findings in Romanian adults, who also have somewhat lower 12-month prevalence of psychiatric disorders (8.3%) than Western European adults (11.5%) [4, 17]. This pattern suggests the possibility of culturally related reporting patterns.

Cultural explanations do not explain the difference between rates of psychiatric disorders in this study (10.4% when all disorders were included) and those reported in the smaller group of community comparison children studied as part of the Bucharest Early Intervention Project (BEIP) (16.9%) [53]. Both the studies used PAPA, making it less likely that measure itself contributed to the difference. Although it is possible that there were systematic differences in administration of the interview, this seems unlikely because the interviewers were trained together. The major differences between the two studies are the much larger sample size and the sampling methodology used in this epidemiologic study, which reduces the impact that any single individual has on the prevalence rate.

In the current study, the relatively low prevalence rate was most notable in the behavioral disorders, whose prevalence was lower than US reports as well as German reports [26]. It seems likely that this pattern is related to the cultural understanding of impairment associated with behavioral patterns, as the CBCL results suggest similar rates of behavioral patterns in our sample as in US norms and other European groups. Impairment associated with the behavioral patterns is an indicator partly of the severity of the behaviors. However, it also reflects the cultural or family developmental expectations and the degree to which accommodating a child's behavior is considered problematic. In our study, two-thirds of the young children who met ADHD symptom criteria were not reported to be impaired. This finding can be compared to a study of older children with ADHD in Germany in which 20% of children who met criteria for ADHD were not impaired [14]. It is possible that, in Romania, these behaviors do not interfere with expectations about a child's ability to go out in public, interact with others, and learn. The lack of reported impairment may also be explained by the finding that nearly three quarters of children in the study were cared for at home, where adults can tailor the routine to the child, rather than in out-of-home childcare, where more behavioral regulation is generally adaptive and more active or impulsive behaviors may be considered disruptive. By contrast, 60% of US children attend out of home placements [49]. The remainder of the demographic factors we examined do not distinguish our sample from US populations. In our study, internalizing disorders were also found to be present at a somewhat lower rates than in other studies [12, 16]. Potential explanations for this difference include fewer opportunities for separation anxiety because of in-home child care, or parental attunement to a child's internal emotional state. It is possible that concerns about stigma about all types of psychiatric disorders in Romania are associated with minimizing the impact of child symptoms or that limited access to mental health service is associated with increased accommodation to a moderate level functional impairment [27].

The findings in this study highlight the cumulative burden associated with psychiatric disorders on young children in Romania. As in other studies, children with psychiatric disorders were impaired and had similar rates of comorbidity as other studies in preschoolers, indicating that the disorders identified are not benign developmental variations [6, 16, 18, 29, 33, 35]. The finding that traumatic early childhood experiences and family psychiatric history were associated with increased risk of psychopathology in very young children adds to the existing literature demonstrating that very early caregiving risks are reflected in the developing mental health of young children [18, 20, 43] and with adult medical outcomes [13].

Some limitations of this study must be noted. First, although psychiatric diagnostic criteria validity for some diagnoses is empirically supported in the US preschoolers, the validity of most disorders warrant further research, especially in European preschoolers. Although most epidemiologic studies in child psychiatry use parent report (e.g. [11, 16]) parent report is a limited assessment tool which, optimally, can be supplemented by observational data. Retention in a two-stage study is also an important factor. Although we identified few differences completers and non-completers, we cannot rule out the possibility that systematic patterns in retention failures could exist.

Together, these findings have important implications for the developing infrastructure. First, they remind us that, as in other societies, a substantial proportion of very young Romanians experience debilitating mental health problems that are under-identified and receive almost no treatment. In this study, most children with psychiatric disorders had not previously been identified. Low rates of concern by parents may represent lack of recognition of the patterns, a belief that these patterns are transient, or hopelessness that there is help for these patterns. A system of early identification of these children could allow effective treatment for these children. As the Romanian early childhood mental health system develops, children will benefit from increased identification rates of concerning emotional and behavioral patterns by parents, medical providers, and child care providers and increasing access to adequate mental health care for very young children. The higher risk children for whom targeted screening may be warranted include those with reported history of traumatic experiences, family history of psychiatric disorders, and fewer family resources. In addition, the finding that parent reported pregnancy problems and colic are strongly associated with early childhood diagnoses suggests that these risk factors may also help to identify children at highest risk. Further study is warranted to determine the degree to which pregnancy and infancy medical factors confer prospective risks going forward through biological insults, social or environmental risks, or through the mediation of the parent's internal representation of the child, that is, how she perceives the child and therefore interacts with the infant. It is also possible, given the design of this study, that these associations are only seen retrospectively in children about whom a parent is concerned and reflect current heightened awareness of possible risk factors rather than independent risk [38].

Regardless of the reason for these associations, understanding demographic, medical, and family factors associated with early childhood psychopathology will be important in early identification and allocation of the precious mental health resources. Many early childhood disorders are responsive to treatment and these early interventions are likely cost effective, especially when considering the mental health, educational, and criminal justice expenditures to society when early mental health problems are not treated [8, 23, 25, 34]. Therefore, identifying high risk children, screening them for psychopathology, and training a workforce to be able to provide appropriate treatment could substantially reduce the developmental risks for these young children.

Acknowledgments The authors express their appreciation to the families and staff at Dr. Victor Gomoiu Children's Hospital and the Marie Curie Children's Hospital. This study was funded by the Fundatia Tulane, Bucharest, Romania

Conflict of interest None of the authors have competing interests related to this study.

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