Evaluating Parental Disagreement in ADHD Diagnosis: Can We Rely on a Single Report From Home?

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Abstract

Objective: Few studies assessed factors associated with the agreement/disagreement between fathers and mothers when rating ADHD symptoms of their offspring. Method: Teachers and both parents assessed a referred sample of 98 children and adolescents aged 6 to 16 years (M age = 9.79, SD = 2.59) using the Swanson, Nolan, and Pelham (SNAP-IV) rating scale. The agreement was assessed for each of the items of the scale and correlated with variables measuring children’s features, socioeconomic adversity, family functioning, and parental psychopathology. Results: Mean agreement between parents was moderate for the inattentive and good for the hyperactive-impulsive construct. Mothers tended to report more symptoms than fathers. The agreement was lower in those families where parents had discrepant educational levels. Conclusion: Our findings suggest a significant cross-informant disagreement between parents on symptoms of ADHD. Discrepant parental education has a relevant role in explaining parental disagreement in reporting ADHD symptoms. (J. of Att. Dis. 2017; 21(7) 561-566)

Keywords
ADHD, SNAP-IV, interrater agreement, educational level

Introduction

ADHD is a heterogeneous syndrome characterized by pervasive and impairing symptoms of inattention, hyperactivity, and impulsivity (Diagnostic and Statistical Manual of Mental Disorders [4th ed., text rev.; DSM-IV-TR]; American Psychiatric Association [APA], 2000). Worldwide, it is highly prevalent in childhood and adolescence (Polanczyk, de Lima, Horta, Biederman, & Rohde, 2007; Willcutt, 2012) and tends to persist into adulthood (Polanczyk & Rohde, 2007), contributing to substantial lifetime impairment (Polanczyk et al., 2007).

With the launching of the new version of DSM, there is an opportunity to discuss diagnostic criteria and clinical recommendations for ADHD. Regarding the source of information, current guidelines recommend that clinicians should obtain information from parents and teachers to document impairment in at least two different settings when considering ADHD diagnosis in children (Subcommittee on Attention-Deficit/Hyperactivity et al., 2011). The field is not expecting much change in this scenario with the DSM-5.

However, many questions are unanswered on information source in ADHD. Who should be the informant about symptoms at home? Is the information collected from one of the parents enough? What is the clinical relevance of collecting information from both parents? Are there specific symptoms, groups of symptoms, or situations that should be more relevant to get information from both parents? Previous studies on broadband rating scales have found good agreement between parents on externalizing symptoms and lower agreement for internalizing symptoms (Duhig, Renk, Epstein, & Phares, 2000). Studies investigating factors associated with agreement showed an important role for child’s age and gender, parental psychopathology, and family characteristics such as socioeconomic status and family functioning (De Los Reyes & Kazdin, 2005). Regarding ADHD symptom-specific rating scales, Sollie, Larsson, and Morch (2012) found that the choice of parent informant and informant combination had a considerable impact on estimates of ADHD, as mothers consistently rated their children as having more attention and hyperactivity problems (Sollie et al., 2012). Langberg et al. (2010) assessed which set of variables would predict agreement

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between parents on ADHD symptoms (Langberg et al., 2010). They found that families with more parental stress had lower agreement, but none of the other measured potential predictors were significantly associated with parental agreement.

Given the little evidence available, guidelines do not touch the clinical question on how to handle multiple raters at home and possible discrepancies. To date, no studies that we are aware of have measured the agreement on specific ADHD symptoms, and only few searched for possible mediators of low agreement. In this context, we aim to evaluate the agreement between raters in a well-characterized sample of children with ADHD by (a) determining the agreement between mothers, fathers, and teachers on ADHD symptoms; (b) assessing whether the agreement between parents is smaller for a particular group of ADHD symptoms; and (c) evaluating potential factors that might be associated with worse agreement. We hypothesized that there will be higher agreement between parents than between parents and teachers and that the agreement will be higher for hyperactivity/impulsivity symptoms. We also expected that parent functioning might be associated with parental agreement on ADHD symptoms.

Method

Sample

Patients included in this investigation were children and adolescents recruited for a previous study conducted at Hospital de Clínicas, Porto Alegre, Brazil, in which possible predictors of response to ADHD treatment with methylphenidate at the ADHD Outpatient Program were investigated. Thus, the detailed methodology can be found there (Chazan et al., 2011).

Inclusion criteria for the present study are the following: (a) age between 5 and 17 years, (b) ADHD diagnosis according to Diagnostic and Statistical Manual of Mental Disorders (4th ed.; DSM-IV; APA, 1994), and (c) baseline ADHD symptoms rated by the teacher and by both parents on the Swanson, Nolan, and Pelham (SNAP-IV) rating scale.

Participants were 98 children and adolescents aged from 6 to 16 years (M age = 9.79, SD = 2.59), being 70.4% of the male sex. The ethical committee of our University Hospital approved this investigation. Parents gave written informed consent, and verbal assent was requested from children and adolescents to participate.

Measures

SNAP. The three different informants evaluated each of the participant’s ADHD symptoms on the SNAP-IV rating scale (Swanson et al., 2001). In this scale, 18 items directly derived from DSM criteria for ADHD are rated according to the severity (i.e., 0 = not at all, 1 = just a little, 2 = pretty much, and 3 = very much) of the correspondent symptoms presented by the patient in the preceding 4 weeks. For each informant, we calculated the mean of ratings on the nine inattentive and nine hyperactive/impulsive items; means yielded inattention and hyperactivity/impulsivity scores, respectively. Likewise, the mean of all 18 ADHD items’ ratings yielded the ADHD total score. SNAP is a scale frequently used in ADHD investigations (Swanson et al., 2001), with internal consistency varying from good to excellent (Stevens, Quitter, & Abikoff, 1998). The scale has been validated in Portuguese (Mattos, Serra-Pinheiro, Rohde, & Pinto, 2006).

Potential associated factors. As we were interested in assessing variables potentially associated with agreement between parents in the SNAP-IV scores, we investigated variables conceptually associated with agreement on behavior rating scales from the literature. We selected variables measuring child features (age, gender), socioeconomic adversity (socioeconomic status, level of parental education, and difference in educational level between parents), family functioning (parental marital status and Family Environment Scale [FES] scores) and parental psychopathology (Adult Self-Report Rating Scale [ASRS] and DSM-IV diagnosis of parental depression, dysthymia, mania, anxiety, ADHD and substance abuse).

Statistical Analyses

We assessed agreement between fathers, mothers, and teachers in the SNAP scores through intraclass correlation coefficient (ICC; Shrout & Fleiss, 1979). ICCs for each dimension of symptoms, as well as for total ADHD symptoms, yielded the respective levels of agreement, graded as virtually no agreement (ICC = .00-.10), slight agreement (ICC = .11-.40), fair agreement (ICC = .41-.60), moderate agreement (ICC = .61-.80), and substantial agreement (ICC = .81-1.00) as suggested by Shrout (1998). In an attempt to evaluate the impact of different reports on the rates of ADHD diagnosis, we performed cross-tabulation of ADHD cases diagnosed on the basis of maternal report in opposition to cases identified through paternal report.

The aim of the second part of the analysis was to examine factors possibly associated with worse agreement in parental ratings. To identify which symptoms had the lowest agreements, we assessed ICCs between fathers’ and mothers’ ratings for each of the 18 symptoms; symptoms with ICCs graded as lower than fair agreement (i.e., lower than .4) were selected for further analyses. First, we performed a sum of the ratings on such symptoms both for the father and for the mother; subsequently, we calculated the difference between parental ratings on the sum of these
items. We used this difference as the dependent variable searching for possible association with the potentially correlated variables. For these analyses, initially we explored all variables from the literature conceptually associated with low agreement in bivariate analyses using ANOVA, t test, and bivariate correlation. Those that presented an association with the dependent variable, \( p < .2 \), were entered in the final multivariable regression model.

### Results

#### Interrater agreement

The ICC analysis showed moderate agreement between parents for hyperactivity-impulsivity (\.755; 95% confidence interval \[ CI = [.654, .830] \) and ADHD total score (\.675; 95% CI = [.549, .771]), and fair agreement between parents for inattention scores (\.481; 95% CI = [.310, .621]). Mothers and teachers had fair agreement considering Hyperactivity-impulsivity (\.481; 95% CI = [.310, .621]). All other analyses between parents and teachers showed only slight agreement between them (see Table 1). Mothers tended to report more symptoms than fathers (\( M \text{ ADHD total score} [SD]: 1.74 [.57] \) vs. 1.52 [.62], \( p = .014 \); see Supplementary Table 1).

We identified that fathers and mothers had lower agreement when evaluating specific items of the SNAP scale (see the correlation among items according to parental reports in Supplementary Tables 2 and 3). Items 1 (Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities), 5 (Often has difficulty organizing tasks and activities), and 9 (Often is forgetful in daily activities) of the SNAP questionnaire had less than fair agreement (ICC < .4) between the two evaluators, and we selected the difference between the sum of these scores to be the dependent variable.

The proportion of categorical ADHD diagnosis changed remarkably according to different sets of raters in our sample (see Figure 1). Taking into account only reports from home, diagnostic status would change in 28.5% of the cases.

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**Table 1. Level of Agreement Between the Mother, Father, and Teacher Regarding Each SNAP Scale Item as Defined by the ICC.**

| ADHD symptoms                                                                 | Mother × Father | Mother × Teacher | Father × Teacher |
|-------------------------------------------------------------------------------|-----------------|------------------|------------------|
| 1. Often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities | \( .397^{**} \) | .156             | .179*            |
| 2. Often has difficulty sustaining attention in tasks or play activities       | \( .498^{**} \) | −.046            | .042             |
| 3. Often does not seem to listen when spoken to directly                       | \( .588^{**} \) | .192*            | .119             |
| 4. Often does not follow through on instructions and fails to finish schoolwork, chores, or duties | \( .524^{**} \) | .337*            | .226*            |
| 5. Often has difficulty organizing tasks and activities                        | \( .177^{*} \) | .294**           | .092             |
| 6. Often avoids, dislikes, or reluctantly engages in tasks requiring sustained mental effort (e.g., schoolwork or homework) | \( .477^{**} \) | .142             | .145             |
| 7. Often loses things necessary for activities (e.g., toys, school assignments, pencils, books, or tools) | \( .486^{**} \) | .306**           | .297**           |
| 8. Often is distracted by extraneous stimuli                                   | \( .449^{**} \) | .175*            | .297**           |
| 9. Often is forgetful in daily activities                                      | \( .373^{**} \) | .113             | .072             |
| 10. Often fidgets with hands or feet or squirms in seat                         | \( .567^{**} \) | .252**           | .218*            |
| 11. Often leaves seat in classroom or in other situations in which remaining seated is expected | \( .683^{**} \) | .508**           | .376**           |
| 12. Often runs about or climbs excessively in situations in which it is inappropriate | \( .666^{**} \) | .247**           | .231*            |
| 13. Often has difficulty playing or engaging in leisure activities quietly      | \( .598^{**} \) | .182*            | .181*            |
| 14. Often is “on the go” or often acts as if “driven by a motor”               | \( .655^{**} \) | .476**           | .478**           |
| 15. Often talks excessively                                                    | \( .459^{**} \) | .244**           | .300**           |
| 16. Often blurts out answers before questions have been completed              | \( .682^{**} \) | .239**           | .211*            |
| 17. Often has difficulty awaiting turn                                         | \( .576^{**} \) | .358**           | .408**           |
| 18. Often interrupts or intrudes on others (e.g., butts into conversations/games) | \( .603^{**} \) | .265**           | .203*            |

**Mean Inattention score**: \( .546^{**} \) \( .229^{**} \) \( .172^{*} \)

**Mean Hyperactivity-Impulsivity score**: \( .755^{**} \) \( .481^{**} \) \( .381^{**} \)

**Mean ADHD Total score**: \( .675^{**} \) \( .323^{**} \) \( .298^{**} \)

**Note.** SNAP = Swanson, Nolan, and Pelham; ICC = intraclass correlation coefficient. Boldfaced items had an ICC of < .4.

*\( p < .05. \) **\( p < .01. \)
depending on choosing mothers’ or fathers’ report. As expected, the majority (92.8%) of discrepant cases occurred for children with a positive diagnosis according to mothers’ but not fathers’ report. Requiring teachers report for composing ADHD diagnosis consistently lowered categorical disagreement: only 13.4% of the cases remained discrepant, 98.7% of them due to mothers’ higher ratings.

**Figure 1.** Percentage of children who would be diagnosed with ADHD considering different combinations of raters for the symptoms.

**Table 2.** Linear Regression Model Showing the Beta Coefficient and the p Value of the Association With the Dependent Variable.

| Variable          | β    | p value |
|-------------------|------|---------|
| Constant          | .054 | .054    |
| Marital status    | .094 | .414    |
| FES score         | .055 | .630    |
| Educational difference | .356 | .003    |

Note. $R^2 = .144$. FES = Family Environment Scale. Boldfaced items had a p-value < 0.05.

**Associated Factors**

Marital status ($p = .015$) and FES score ($p = .122$), both representing family functioning, and educational level difference ($p = .03$) had, during our analysis, association with the dependent variable with a p value < .2. Regarding these associations, greater disagreement was noticed in divorced parents, with families with lower FES scores reflecting poor functioning and parents with greater difference in educational levels. In linear regression, only the association with the parental educational level difference remained statistically significant ($p = .003$). It is important to notice, however, that this model explained less than 15% of the dependent variable variability ($R^2 = .144$), suggesting that the educational level difference is far from being enough to explain the disagreement (see Table 2).

**Discussion**

In this study, we aimed to determine whether obtaining information on ADHD from the father or the mother impacts the diagnosis in 98 children from a clinic-referred sample. Mothers and fathers showed moderate to good agreement in the assessment of ADHD symptoms in their offspring. Moreover, this agreement was better when considering hyperactivity-impulsivity than inattentive symptoms, corroborating the idea that externalizing symptoms are more consensual between raters than internalizing ones (Achenbach, McConaughy, & Howell, 1987; Duhig et al., 2000), due to the fact that inattentive symptoms likely reflect more introspective and subtle behavior than the explicit manifestations of hyperactivity.

Our findings concur with previous results from the literature. The overall agreement between mothers and teachers (.323) and between fathers and teachers (.298) was similar to that found by Wolraich et al. (2004). The agreement found between parents and mothers is in accordance with previous studies: Duhig et al. (2000), in a meta-analysis, found that the interparental agreement was moderate for internalizing symptoms and large for externalizing symptoms. Langberg et al. (2010) recently reported a smaller agreement (.38) than we did (.675), but Sollie et al. (2012) found a very similar agreement (.66).

The level of agreement, however, was not homogeneous. It varied not only among different pairs of raters, but also among different symptoms evaluated. All three symptoms that had the worse level of agreement address attention issues (Often fails to give close attention to details or Makes careless mistakes in schoolwork, work, or other activities; Often has difficulty organizing tasks and activities; and Often is forgetful in daily activities). However, we are not aware of previous investigations that assessed the agreement for each ADHD symptom, so any comparison with previous data is not possible. In general, mothers rated their children with higher ADHD scores than the fathers did. This is a pattern extensively reported in the literature and several mechanisms have been proposed to explain it. For example, mothers tend to spend more time than fathers with their children and are therefore more exposed to the children’s behavior. In addition, there is a tendency of some children to better behave in the presence of fathers (Duhig et al., 2000).

In our sample, couples with a greater difference of educational level had lower agreement in the three inattentive symptoms mentioned before, and this association remained significant when controlling for marital status and a psychosocial measure of the family environment. Previous studies already associated the educational level of the informant with agreement: Van Roy, Groholt, Heyerdahl, and Clench-Aas (2010) found that low parent education was associated with higher levels of disagreement between parents and the child in the Strenght and Difficulties (SDQ)
questionnaire; Epstein, March, Conners, and Jackson (1998) and Gagnon, Vitaro, and Tremblay (1992) showed an association between informants’ educational background and the amount of agreement between caregivers and teachers describing the functioning of 10- to 16-year-old children and kindergartners. Otherwise, in a study by Penney and Skilling (2012), educational level was not found to be a moderator of informant agreement in the assessment of adolescent psychopathology.

Our study should be understood in the context of some limitations. First, our sample is small, clinically referred, and comes from a specific geographic area. So, our results should be extrapolated to other nonreferred samples with caution. Second, it is important to notice that we did not have data on impairment according to different raters. Third, alternative data analytic approaches, such as item response theory, might have added to the information presented here. Lastly, the variables analyzed as potential associated factors were not originally conceived for current analyses and did not supply enough data to test all hypotheses generated based on the review of the literature.

Our findings have significant implications for clinical practice. Depending on whom we choose to report on ADHD symptoms at home (mother or father), the proportion of categorical diagnosis changes. The discrepancy was due to a positive diagnosis according to the mother and not the father in most of these cases. Although this finding might indicate more awareness of the mothers in recognizing ADHD symptoms, we cannot discard the fact that some of them might be overreporting symptoms. Thus, whenever possible, getting information from both parents might improve diagnostic accuracy.

Furthermore, the association between disagreement and the difference in parental educational levels highlights an additional possible mechanism of disagreement not yet well explored in the literature. It is possible that different levels of instruction lead to different perceptions of the ADHD symptoms and/or different styles in reporting symptoms. Situations where such difference is exceptional should raise the clinician’s attention, as they have potential impacts on diagnosis and therefore the treatment decision.

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