

Persistence of attention deficit/hyperactivity disorder into adulthood: a study conducted on parents of children diagnosed with attention deficit/hyperactivity disorder

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Abstract

Objective: To determine the persistence of Attention Deficit Hyperactivity Disorder (ADHD) into adulthood in parents of children diagnosed with ADHD and currently attending child and adolescent psychiatric clinics (located at a tertiary academic hospital and a community based clinic). **Method:** A structured questionnaire was completed by 58 parents of ADHD children. Those parents identified as having childhood ADHD were further required to complete a screening questionnaire for adult ADHD. **Results:** 37.9% (22) of the 58 participants were found to have had childhood ADHD. Of these 22 participants 36.4% (8) were still found to have symptoms suggestive of ADHD. **Conclusion:** Childhood ADHD has been reconceptualised as a lifespan disorder. Our study was in keeping with other studies showing a persistence of ADHD symptoms into adulthood.

Keywords: Attention Deficit Hyperactivity Disorder (ADHD), Adult ADHD, Comorbid Substance use

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Introduction

Attention Deficit Hyperactivity Disorder (ADHD), which is marked by inattention, distractibility and impulsivity, has long been known as a childhood disorder. ADHD is the most common emotional, cognitive and behavioural disorder treated in children affecting an estimated 4-12% of school aged children. It carries a high rate of psychiatric comorbidity, notably oppositional defiant disorder, conduct disorder, mood and anxiety disorders and cigarette and substance use disorders.^{1,2}

Childhood ADHD (CADHD) was first recognized in the early 1900's but recognition of the disorder's persistence into adulthood did not occur until the 1970's. The pioneers who first identified ADHD in young children assumed that they would outgrow the condition in adulthood. This disorder is still under-recognised and under-diagnosed.

Most authors stress the diagnostic continuity of ADHD

throughout the lifespan and assert that clinically referred adults have the same syndrome that has been so well validated in paediatric cases.²

In a longitudinal study of ADHD boys Biederman et al found that by age nineteen, 38% of children still had the full ADHD diagnosis, 72% showed persistence of at least one third of the symptoms required for the diagnosis and 90% showed evidence of clinically significant impairment.^{2,8}

Recent literature which includes follow up studies has found that the persistence of ADHD into adulthood is higher than previously thought with as many as fifty percent (50%) to two thirds of children with ADHD continuing to have the disorder as adults. It is also estimated that the prevalence rate of adult ADHD (AADHD) is 4.5%.^{1,3,4}

No figures are available for South Africa.

The social and societal costs of untreated ADHD are considerable and underpin the importance of identifying ADHD as a disorder that can continue across the lifespan into adulthood. In recent years the recognition, diagnosis and treatment of AADHD has been increasing and the gender ratio has been found to be 1:1.^{1,7} The DSMIV has also acknowledged that full fledged ADHD could persist into adulthood.⁵

When a patient's presentation suggests the possibility of

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AADHD a thorough developmental history is needed to establish the presence of CADHD emphasizing the continuum of the disorder. To warrant the diagnosis the symptoms must cause impairment in at least two settings.^{5,7}

Although the clinical features of AADHD are reminiscent of the highly recognisable symptoms of CADHD, presentation of the disorder after childhood usually evolves and changes in an age appropriate manner as the individual matures.³

The hyperactivity symptoms of childhood i.e. excessive running and climbing is not expected in adulthood and rather these childhood symptoms may be expressed as working in a very active job or having several jobs.

Inattentive symptoms may become more prominent and may be perceived as incompetence by the patient or those around him. Inattentive symptoms may manifest as neglect, poor time management, motivational deficits (difficulty initiating, completing or changing tasks) and poor concentration.

Impulsive symptoms persist and may have more serious consequences in adulthood. These individuals may have more motor vehicle accidents and have low tolerance for frustration, which may lead to frequent job changes and unstable and interrupted interpersonal relationships.

The need for more research in AADHD is emphasised by the finding that these patients have a high rate of comorbidity.

Some adults with ADHD self medicate with cigarette smoking, excessive caffeine consumption or abuse of/ or addiction to alcohol or illicit drugs such as cocaine. In many instances a presenting comorbidity may be the first clue to a diagnosis of AADHD.^{1-3,7}

The majority of adults with ADHD have at least one additional psychiatric disorder such as anxiety, substance abuse, bipolar disorder or major depressive disorder. Such high rates of comorbidity have a tendency to disguise the diagnosis of AADHD.^{3,7}

The aetiology of ADHD is multifactorial and it is important to note that heritability also plays a major role. Studies on monozygotic and dizygotic twins have found that 75% of the aetiological contribution to this disorder is genetic. One study suggests that 50% of children whose parents have ADHD also have the disorder. Molecular genetics studies have implicated the dopamine transporter (DAT1) and D₂ and D₄ postsynaptic receptors as candidate genes.^{1,5,8}

Because genes affect one's susceptibility to ADHD family studies provide a method of assessing the validity of adult ADHD. If ADHD persists into adulthood then the parents of ADHD children and the children of ADHD adults should show an increased risk for ADHD.

Therefore family studies provide a method of assessing the validity of AADHD.^{1,2,5,8}

The aim of our study was to determine the persistence of CADHD into adulthood in a population of parents of children currently diagnosed with ADHD at the Weskoppies Hospital and Eersterus Clinics. Our primary objectives included determining the prevalence of CADHD and persistence into AADHD. Secondary objectives included determination of occupational and marital histories as well as co morbid conditions in the subgroups with AADHD and those with no ADHD.

Method

Approval for conducting the study was obtained from the Research Ethics Committee of the Faculty of Health Sciences of

the University of Pretoria. The study was a descriptive one. The biological parents of all children diagnosed with ADHD seen at the child unit at Weskoppies Hospital Outpatients Department and at the Eersterus Clinic from the 01 March 2005 till the 31 March 2005 were included in the study. Parents had to be older than 18yrs.

The study was carried out by means of a structured questionnaire. Questions pertained to age, sex, marital status, educational level, substance use and occupational history. The diagnostic criteria for ADHD in the DSM IV was utilized to determine the diagnosis of CADHD.

The Adult ADHD Self Report Scale Symptom Checklist Screening Questionnaire was utilized to determine ADHD symptoms in adulthood. This checklist was developed in conjunction with the World Health Organisation and the workgroup on AADHD. The ASRS is based on DSM IV criteria. but the questions are designed to suit an adult.¹⁰ It is important to note that it is a useful screening tool and is not meant to be diagnostic but rather to assist in the diagnostic process.

Data was entered and analysed using the statistical programme SAS® (Version 8.2). Derived variables were created from the data, which included childhood attention deficit hyperactivity disorder (CADHD) and adult attention hyperactivity disorder (AADHD). Frequencies were then calculated for the rest of the data.

It is important to stress that comparative statistics for significance could not be applied to this study as the sample was one of convenience and not a probabilistic sample.

Results

Fifty nine (59) children were identified as having ADHD from records at the Eersterus and Weskoppies Clinics.

Seven (7) of these children were in foster care and eighteen (18) did not follow up at the clinic for their monthly visit during the time of the study. Attempts to contact these parents telephonically were unsuccessful.

This left thirty four (34) children whose parents could be included in the study i.e. 68 parents. The response rate was 85.3% as only 58 parents completed the questionnaire. Two (2) refused, two (2) were deceased and six (6) had no contact with the spouse interviewed. It is interesting to note that of the non responders 90% were male and 10% female.

Prevalence of Childhood ADHD

Only 5 (8.6%) of the 58 respondents had been diagnosed with ADHD as children. Of these 2 (40%) were male and 3 (60%) female.

The 53 respondents who had not been diagnosed with ADHD as children were then taken through the DSM IV criteria for ADHD in order to ascertain retrospectively whether they met the criteria for ADHD in childhood. A further 17 (29.3%) parents were thus found to have met the criteria for CADHD. Of these 17, 8(47.1%) were male and 9(52.9%) were female.

Therefore a total of 22 (37.9%) participants were found to have met the criteria for CADHD. Of these 22 participants, 10(45.5%) were male and 12(54.5%) were female.

Persistence of ADHD into Adulthood

These 22 respondents thus identified as having met criteria for CADHD were then asked whether they had been diagnosed as having AADHD.

Table I: Demographics				
Variable		Group		
		All Respondents n=58	NO ADHD n=36	AADHD n=8
Gender n (%)	Male n (%)	25 (43.1%)	15 (41.7%)	3 (37.5%)
	Female	33 (56.9%)	21 (58.3%)	5 (62.5%)
Age at interview Years	<35yrs	19 (32.8%)	9 (25.0%)	5 (62.5%)
	35-40	29 (50.0%)	18 (50.0%)	3 (37.5%)
	>40yrs	10 (17.2%)	9 (25.0%)	0 (0.0%)
Marital status	First Marriage n (%)	32 (55.2%)	18 (50.0%)	5 (62.5%)
	Remarried	8 (13.8%)	5 (13.9%)	0 (0.0%)
	Divorced	12 (20.7%)	9 (25.0%)	2 (25.0%)
	Single	6 (10.3%)	4 (11.1%)	1 (12.5%)
Educational level	< Grade 11	18 (31.0%)	11 (30.6%)	2 (25.0%)
	Matric	21 (36.2%)	12 (33.3%)	5 (62.5%)
	Degree	7 (12.1%)	4 (11.1%)	1 (12.5%)
	Diploma	12 (20.7%)	9 (25.0%)	0 (0.0%)

We also enquired as to who had made the diagnosis. Only 1 female (4.5%) respondent had been diagnosed as having AADHD. This diagnosis had been made by the Attention Deficit Hyperactivity Association of South Africa (ADHASA).

The other 21 respondents who had not been diagnosed with AADHD were then asked to complete the Adult ADHD Self Report Scale Symptom Checklist Screening Questionnaire. Based on this a further 7 (31.8%) respondents were identified as having symptoms suggestive of AADHD which warranted further investigation. Of these 7 respondents 3(42.9%) were male and 4(57.1%) were female.

Therefore of the 22 respondents identified as having childhood ADHD a total of 8 (36.4%) were found to have symptoms still suggestive of ADHD. Of these 8 respondents 3(37.5%) were male and 5(62.5%) were female.

From the above we could then divide our respondents into the following 3 groups:

No ADHD (n=36)

Respondents with CADHD only (n=14)

Respondents with CADHD persisting to AADHD (n=8)

The group with CADHD only i.e. not persisting into AADHD were not included as a separate comparator group in terms of demographics and comorbidity. With regards to these, in our study, we focused on the participants with no ADHD and those found to have symptoms suggestive of AADHD.

Demographics

The demographics of the 2 groups as described above i.e. those with No ADHD and those with AADHD as well as of the entire group are represented in Table I.

Employment Status

Participants were asked about employment history, which also included the number of jobs held in the last 5 years. Results are summarised in Table II. There was a higher rate of unemployment in the AADHD group (50.0% vs. 36.1%)

It is important to note that in patients with symptoms suggestive of AADHD 50% had held more than 3 jobs in the last 5 years vs. 11.1% of those with no ADHD. Of note 1 of the participants in the AADHD group held 25 jobs in the last 5 years.

Substance Use

Participants were also asked about their use of substances currently and in the past. This included recreational drugs as well as prescription medications.

Results are summarised in Table III.

Alcohol:

Of the 58 participants 26 (44.8%) were using alcohol daily, weekly or monthly.

Stratified according to gender 14 (56.0%) males and 12 (36.4%) females used alcohol. Interestingly 4 (80%) current daily users and 2 (100%) past daily users are male.

Table II: Employment status				
Variable		Group		
		All Respondents n=58	NO ADHD n=36	AADHD n=8
Employed	Yes n (%)	39 (67.2%)	23 (63.9%)	4 (50.0%)
	No	19 (32.8%)	13 (36.1%)	4 (50.0%)
Number of Jobs Held in last 5 years	0 n(%)	12 (20.7%)	7 (19.4%)	3 (37.5%)
	1	17 (29.3%)	12 (33.3%)	0 (0.0%)
	2	18 (31.0%)	13 (36.1%)	1 (12.5%)
	>3	11 (19.0%)	4 (11.1%)	4 (50.0%)

In the AADHD group 12.5% used alcohol on a daily basis vs. 5.6% of the No ADHD group.

Marijuana:

There were no current users of marijuana. 9 (15.5%) had used marijuana in the past daily, weekly or monthly. 6 (66.7%) of the users were male. In the AADHD group 37.5% of participants had used marijuana in the past vs. 11.1% of No ADHD group.

Cocaine, Heroin and Mandrax

None of the participants admitted to using heroin or mandrax either currently or in the past. 1 (1.7%) participant admitted to using cocaine monthly in the past. This participant also fell in the AADHD group.

Prescription drugs:

Fifteen 15(25.9%) respondents admitted to using antidepressants either currently or in the past. 9 (15.5%) participants used it daily currently and 6 (10.3%) had used it in the past daily.

Of the 9 currently using antidepressants 2 (22.2%) were male and 7 (77.8%) female.

25% of the AADHD group had used antidepressants in the past daily and 12.5% used them currently daily.

Psychiatric Disorders

Participants also provided information on the presence of psychiatric disorders. The terminology was kept as simple as possible to facilitate completion.

17 % of the total group had some psychiatric disorder. Depression was the most common at 22.4%.

In the AADHD group 25% were diagnosed with depression and 12.5% with bipolar disorder.

Discussion

Limitations

At the outset we must acknowledge that the biggest limitation of our study was the small sample size. The sample was also one of convenience and not a probabilistic one and also limited us in terms of data analysis.

Comparative tests of significance were therefore not appropriate.

The other limitation was that the diagnosis of CADHD was based on retrospective information. This is therefore open to recall bias. However, the diagnostic reliability of reporting adult ADHD symptoms retrospectively from childhood has been validated.

Several systematic reviews have concluded that despite general under-reporting, childhood experiences are recalled with sufficient accuracy to provide useful information in retrospective studies. Self-report forms have all been psychometrically evaluated and found to be valid and reliable as diagnostic aids for AADHD.^{1,9,12}

Our study also utilised parents of children diagnosed with ADHD. A potential confound clouds the interpretation of family studies of AADHD.

The parents of ADHD children are usually aware of the ADHD symptoms in their child. This knowledge may bias them to report

Table III: Substance use

Characteristic		Group					
		All Respondents n =58		No ADHD n =36		AADHD n =8	
		Current	Past	Current	Past	Current	Past
Cigarettes	N	28 (48.3%)		16 (44.4%)		4 (50.0%)	
	D	30 (51.7%)	6 (10.3%)	20 (55.6%)	1 (2.8%)	4 (50.0%)	2 (25.0%)
Alcohol	N	32 (55.2%)		19 (52.8%)		6 (75.0%)	
	D	5 (8.6%)	2 (3.5%)	2 (5.6%)	2 (5.6%)	1 (12.5%)	
	W	10 (17.2%)	3 (5.2%)	8 (22.2%)	1 (2.8%)	0 (0.0%)	2 (25.0%)
	M	11 (19%)	4 (7%)	7 (19.4%)	1 (2.8%)	1 (12.5%)	2 (25.0%)
Marijuana	N	58 (100%)		36 (100%)		8 (100%)	
	D		3 (5.2%)		1 (2.8%)		1 (12.5%)
	W		1 (1.7%)		1 (2.8%)		
	M		5 (8.6%)		2 (5.6%)		2 (25.0%)
Cocaine	N	58 (100%)		36 (100%)		8 (100%)	
	M		1 (1.7%)				1 (12.5%)
Anti-depressants	N	49 (84.5%)		29 (80.6%)		7 (87.5%)	
	D	9 (15.5%)	6 (10.3%)	7 (19.4%)	3 (8.3%)	1 (12.5%)	2 (25.0%)
Mood stabilisers	N	57 (98.3%)		36 (100%)		7 (87.5%)	
	D	1 (1.7%)				1 (12.5%)	
Anti-epileptics	N	57 (98.3%)		35 (97.2%)		8 (100%)	
	D	1 (1.7%)	1 (1.7%)	1 (2.8%)			1 (12.5%)
Sedatives	N	58 (100%)		36 (100%)		8 (100%)	
	D		1 (1.7%)				1 (12.5%)
Analgesics	N	57 (98.3%)		36 (100%)		8 (100%)	
	D	1 (1.7%)					

ADHD symptoms themselves. This would then make the rates of ADHD among adult relatives of ADHD children spuriously high.

Interestingly though in a study comparing the prevalence of symptoms between 26 ADHD adults who had ADHD children and 49 ADHD adults who did not, symptoms were nearly identical between the groups. This led the authors to conclude that adults with ADHD children are not inclined to over-report the symptoms of ADHD in themselves.²

In screening for AADHD the 6 item screening version of the ASRS was utilised rather than the longer 18-item test. In defence of this in a study by Kessler et al (2005) the 18 item test was compared to the 6 item screening version. The six item screener outperformed the eighteen question ASRS in sensitivity (68.7% vs. 56.3%), specificity (99.5% vs. 98.3%) and total classification accuracy (97.9% vs. 96.2%). The authors concluded that at this time the 6 question screener should be preferred to the full ASRS both in community surveys and in clinical outreach and case finding initiatives.⁶

Finally in order to make the diagnosis of AADHD it is important to have a full clinical interview with the patient. This would then elicit areas of impairment to finalise and confirm the diagnosis. Due to time constraints and the nature of the study this was not possible. We can therefore conclude from the screening questionnaire that participants had symptoms suggestive of AADHD but cannot make this diagnosis at this time.

Response

There was a good response rate of 85.3%. What was interesting in terms of the non-respondents was that 90% were male. The majority of these non-respondents (80%) also had no contact with the family. If included in the study our pick up rate of ADHD may have been higher as in AADHD the patients often have poor interpersonal relationships and are more likely to be divorced.

Prevalence of CADHD and AADHD

Prevalence of ADHD in children is estimated at between 4-8% and if there is an average of 50% persistence into adulthood then prevalence in adults should be between 2-4%. What is interesting to note is that research involving clinically significant samples of AADHD show that symptoms are equally prevalent among men and women whereas in children with the disorder it is more prevalent among boys than girls.¹⁷

In our study we found a prevalence of CADHD of 37.9%. Of these 45.5% were male and 54.5% were female. This discrepancy from other studies could be due to our sample having a higher number of females compared to males as well as to the fact that CADHD in girls is under-identified.

The prevalence of CADHD in the community ranges from 4-8%. The higher prevalence in our group of parents of children with ADHD also emphasises the role of genetics in ADHD.

The fact that only 1 (4.5%) of the patients had been diagnosed with ADHD in adulthood also highlights the point that this disorder is under-recognised and under-diagnosed as most studies have found persistence of symptoms in about 50% of cases. What is also important is that this diagnosis was not made by the medical fraternity but by a support group (ADHASA) which once again highlights that the medical fraternity may be reticent about recognising the persistence of this disorder into adulthood.

In the screening questionnaire we found a persistence of ADHD symptoms in 36.4% of adults. This is in keeping with most other studies on AADHD. In the AADHD group 62.5% were female

and 37.5% were male. Once again this discrepancy could be due in part to the sample selected as well as to recall bias as discussed previously.

Demographics

Our respondents were divided into a group with no ADHD (n=36) and one in which there were symptoms suggestive of AADHD (n=8).

Most studies report that ADHD adults are more likely to have multiple marriages. They were also less likely to report good current relationships with peers and one study found that 28% of ADHD adults were divorced compared to 15% of controls.^{2,7}

In our study the majority of our AADHD group (62.5%) were in their first marriage and 25% were divorced. In the no ADHD group 50% were in their first marriage and 25% divorced.

Once again the small sample size and the sample selection could account for this discordance with the literature.

School is the single most common referral source for children and adolescents with ADHD who typically do not achieve their academic potential.

Compared with non ADHD peers they do not perform as well on standardised tests; have higher rates of grade retention (42% vs. 13%), suspension (60% vs. 19%) and dropout (32% vs. 0%); and are less likely to graduate high school.¹

The majority (62.5%) of our AADHD group had a matric but only 12.5% had a degree and no participants had diplomas. In the no ADHD group 33.3% had a matric, 11.1% degrees and 25% had diplomas.

Once again the small sample size makes it difficult to fully evaluate this. It must also be stated that our participants were recruited from public facilities where typically these people tend to come from a lower socio-economic status and cannot afford private health care. The low socio-economic status may also be a reflection of the educational level of our participants.

Employment

With regards to employment it was found that ADHD adults had lower socio-economic status and more work difficulties. ADHD subjects were also found to have held more jobs on average than individuals without ADHD.^{2,7}

In our study 50% of the AADHD group were unemployed compared to 36.1% of the no ADHD group. This is in keeping with other studies where people with AADHD had more difficulties holding down employment. It is also interesting in our study that we found that 50% of the AADHD group had held 3 or more jobs in the last 5 years vs. 11.1% of those with no ADHD.

Also of note is that one respondent in the AADHD group had held 25 jobs in the last 5 years. This highlights the difficulties faced by AADHD patients and the impairment this disorder imparts to their lives.

Substance Use

There has been an increasing interest in the co-occurrence of AADHD and substance use disorders. More than 50% of individuals with untreated ADHD into adulthood will develop a substance use disorder in their lifetime. Other studies have also shown that ADHD adults have elevated rates of substance use disorders. The range for alcohol abuse is 32-53% and for other types of substance abuse including cocaine and marijuana the comorbidity rate is 8-32%.^{1,2,4}

Cigarette smoking is also an area of concern. Studies have

found that about 50% of adults with ADHD smoke as compared with about 25% of the rest of the population.¹⁵

In our study there was generally a high rate of smoking in the entire group. 51.7% of the total group were current smokers vs. 25% of the general population. In the AADHD group 50% were current smokers vs. 55.6% of the no ADHD group.

The high rate of smoking in general in our sample makes it difficult to comment on this. Stratified according to gender it is also alarming to note that 60% of males and 45.5% of females were smokers. The high rate in women is especially important in light of numerous studies, which have found an association between smoking during pregnancy and CADHD.¹⁸

With regards to alcohol use our study found that 12.5% of the AADHD group used alcohol on a daily basis vs. 5.6% of the no ADHD group. If we look at alcohol use current and past in the AADHD group 75% had used alcohol daily, weekly or monthly in their lifetime. In the no ADHD group 58.3% had used alcohol at some point in their lifetime. This shows similar findings to other studies where there is high comorbid alcohol use in patients with AADHD.^{1,2}

This is further borne out with marijuana use. Whilst there were no current users of marijuana, past use shows rates of 37.5% in the AADHD group vs. 11.1% of the no ADHD group. Past cocaine use was also found in the AADHD group only. This is also in keeping with other studies on AADHD, which have shown high comorbid substance use in patients with AADHD.^{1,2}

Psychiatric Disorders

The mood disorders including major depression, bipolar disorder and dysthymia have a comorbidity rate with ADHD ranging from 19-37%. Compared to their male counterparts women had higher rates of major depression (54% vs. 36%), anxiety disorders (28% vs. 15%) and dysthymic disorders (16% vs. 13%).

Approximately 10% of ADHD patients were found to develop bipolar disorder.^{1,4,7} In our study we had a similar finding of 12.5%.

In our study 25% of the AADHD group as well as 25% of the no ADHD group had been diagnosed with depression. No distinction was made between dysthymia and major depression.

It is interesting to note that in the total group 22.4% admitted to having depression.

This is a high rate compared to the general population, which has a prevalence rate of about 10%. Reasons for this high prevalence rate in our study could be related to low socio-economic status with financial difficulties as well as the stressors that go with having a child diagnosed with ADHD. The high rate in the AADHD group is also in keeping with other studies.^{1,4,7}

Highlighting the case of psychiatric comorbidity in AADHD is the use of psychotropic medication. 25% of the patients with AADHD were using either antidepressants or mood stabilisers currently and 25% had also used antidepressants in the past.

Conclusion

In the last decade ADHD has been largely reconceptualised as a lifespan disorder and not merely a condition in childhood. This is borne out by studies indicating a prevalence in adults of 4.5% and continuity from CADHD in up to 50% of cases or more.

Our study has had similar findings with 36.4% of our patients with CADHD still showing persistence of symptoms into adulthood.

This is tempered by the fact that this is a small sample and that the diagnosis of AADHD was not confirmed by clinical interview. However in the South African context the evidence of persistence

of ADHD into adulthood is noteworthy.

The small size of the study should also not detract from the findings of high rates of comorbidity in these individuals especially with regard to alcohol, cigarette smoking, marijuana use and psychiatric disorders.

The high rate of comorbidity and the immense societal and individual costs makes it imperative for us as clinicians to recognise, diagnose and treat this disorder.

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