

Depression and chronic health conditions

Title: Depression and chronic health conditions in parents of children with and without developmental disabilities: The Growing Up in Ireland cohort study

Gallagher, Stephen¹, and Hannigan, Ailish²

¹Centre for Social Issues Research

Dept. of Psychology,

University of Limerick,

Limerick,

Ireland.

Stephen.Gallagher@ul.ie

²Centre for Interventions in Infection, Immunity and Inflammation,

Graduate Entry Medical School,

University of Limerick,

Limerick,

Ireland.

Ailish.Hannigan@ul.ie

Word Count: 2588

Keywords: depression; developmental disabilities; chronic conditions; problem behaviours

Abstract

Epidemiological evidence suggests that poor physical health and depression are highly co-morbid. To date, however, no study has considered whether depression in parents caring for children with developmental disabilities is partly driven by poor physical health. Using data from the Growing Up in Ireland national cohort study (2006 to date), 627 parents of children with developmental disabilities were compared with 7,941 parents of typically developing children on scores from the Centre for Epidemiological Depression Scale, chronic health conditions, socio-demographic and child behavioural characteristics. Having a child with disabilities was associated with a higher risk of depression (odds ratio (OR) = 1.83, 95% confidence interval (CI): 1.43, 2.35) compared to parents of typically developing children. Adjusting for the presence of chronic health conditions accounted for some of this excess risk (OR=1.77, 95% CI: 1.38, 2.27). The association between having a child with disabilities and increased risk of depression was explained, however, by adjusting for the child problem behaviours (OR =1.07, 95% CI: 0.81, 1.43). This study has confirmed, in a population-based sample, the high risk of depression in parents caring for children with developmental disabilities after adjusting for the presence of a chronic health condition. Importantly, given that poor mental health in these parents is associated with a battery of negative health and social family outcomes, it is imperative that health professionals pay attention to the mental health needs of these parents.

Keywords: chronic illness, depression, developmental disabilities, problem behaviours

1. Introduction

Raising a child with a developmental disability (e.g. autism, dyspraxia, attention deficit hyperactivity disorder) is often stressful and parents can sometimes struggle to deal with the exceptional challenges associated within this caring context. A recent meta-analysis revealed that there was a 10% increased prevalence of clinical depression in parents caring for children with developmental disabilities compared to parents of typically developing children (Singer, 2006). This has deleterious consequences for parenting role, family functioning and offspring wellbeing (Dyson, Edgar, & Crnic, 1989; Fisman & Wolf, 1991; Kahn, Brandt, & Whitaker, 2004; Pilowsky, Wickramaratne, Nomura, & Weissman, 2006; White & Hastings, 2004). Moreover, given the negative impact of caring on caregivers experts in the field have called upon authorities to classify caregiver health as a major public health concern (Barrow & Harrison, 2005; Talley & Crews, 2007).

Together with higher rates of depression and stress, parents caring for children with developmental disabilities also have poorer physical health with greater incidence of back problems, migraine headaches, stomach/intestinal ulcers, asthma, arthritis/rheumatism, high blood pressure being found (Brehaut et al., 2004; Gallagher & Whiteley, 2012, 2013; Lovell, Moss, & Wetherell, 2012). A key source of the negative health outcomes seen in these parents is the challenging behaviour (e.g. self-injury, conduct problems) that the child displays (Eisenhower, Baker, & Blacher, 2005; Gallagher, Phillips, Drayson, & Carroll, 2009; Gallagher & Whiteley, 2013; Herring et al., 2006). Epidemiological evidence also indicates that depression frequently occurs with chronic medical conditions and that poor physical health is a risk factor for depression (Moussavi et al., 2007). A recent study found that poor physical health was positively associated with depression in these caring parents (Resch, Elliott, & Benz, 2012), suggesting that co-morbidity is likely in this population; a finding supported by others in a Venezuelan sample of parents (Alvarez, 2012). Although speculative, the increased risk of depression seen in these parents may be partly explained by their physical status and not purely driven by child or other contextual characteristics. Thus, the rates of depression found in these previous small scale studies could be confounded by parent's physical health status. To our knowledge we are not aware of any empirical research that has controlled for physical health problems on the outcome of depression in these parenting families and whether

Depression and chronic health conditions

or not there is an increased prevalence of co-morbidity in these parents relative to parents of typically developing children is yet to be investigated.

The objective of the present study was threefold. First, in a population-based study, we tested whether there was a greater prevalence of depression and poor physical health in parents of children with developmental disabilities relative to parents of typically developing children. Second, we explored whether the increased risk of depression in these parents was still evident after controlling for their physical health status. Finally, we also investigated whether more established risk factors (e.g., the behaviours of the child) explained more of the variance in this risk above and beyond that contributed by physical health status.

2. Methods

2.1 Participants, design and procedure

The sample consists of primary caregivers of 8,568 nine-year-old school children participating in the Growing Up in Ireland Study, a nationally representative cohort study of children living in the Republic of Ireland (Murray et al., 2011). The cross-sectional sample of children was selected through a two-stage sampling method within the primary school system. In the first stage of sampling, 1105 primary schools from the national total of 3177 were selected using a probability proportionate to size (PPS) sampling method. In the second stage, a random sample of eligible children was selected within each school. At the school level, a response rate of 82.3% was achieved, while at the level of the household (i.e. eligible child selected within the school) a total of 57% of children and their families participated in the study. Parents would have been asked to provide consent in all cases. The children in this sample represent approximately 1 in 7 of all nine-year old children resident in Ireland at the start of the study in 2006. The sample was weighted by adjusting the distribution of the sample to known population figures on the number and characteristics of children and their families from the 2006 Census of Population in Ireland. Characteristics accounted for in the weights included family structure, social class, economic and disadvantaged status. Interviews were carried out with the child, primary and secondary caregivers and the teacher of the study child. All stages of the Growing Up in Ireland project were subject to rigorous ethical review by the Irish Health Research Board's standing Research Ethics Committee.

Depression and chronic health conditions

2.2 Measures

2.2.1 Developmental disability status

Parents were asked if they thought their child had a specific developmental/learning difficulty, communication, or co-ordination disorder and 906 (10.6%) of the parents said yes. Of these, 627 (69.3%) self-reported that this disorder had been diagnosed by a professional (See Table 1 for disability subtypes). In total, there were 829 disorders diagnosed by a professional in these children. The remaining 279 (30.7%) children were awaiting a consultation or diagnosis. We also included those classified as ‘slow progress’ in this category. Only those children with a confirmed diagnosis are classified as having a disorder in the analysis.

[Insert Table 1 About Here]

2.2.2 Child Behavioural Problems

The 25-item Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997) was used to screen for child behaviours. We 5-item prosocial subscale was excluded from our analyses in line with previous studies (Gallagher et al., 2009; Gallagher & Whiteley, 2013). Examples of items include “Is restless and cannot stay still for long” and “Is easily distracted, concentration wanders”. Two items are reversed scored “Thinks things out before acting”. Parents are asked to rate whether a behaviour is 0, not true, 1, somewhat true, or 2, certainly true, of their child with higher scores indicating more problem behaviour. The overall scale has been shown to be reliable (Cronbach’s $\alpha = .76$) and the scale has been used as a predictor of both mental and physical health in families of children with developmental disabilities (Gallagher & Whiteley, 2013; Gallagher et al., 2009).

2.2.3 Mental and Physical Health Status

The 8-item Centre for Epidemiological Studies in Depression Scale (CES-D) was used to assess depressive symptomology (Radloff, 1977). We used the recommended cut-point to classify respondents as probably having depression or not having depression (scale score ≥ 7 or < 7 respectively). The overall scale has been shown to be reliable (Cronbach’s $\alpha = .86$). Parents were also asked about their subjective health status (e.g., In general, how would you say your current health is?) rated on a

Depression and chronic health conditions

5-point scale from 1 = excellent, to 5 = poor. They were also asked if they had an ongoing chronic physical or mental health problem, illness or disability. If parents answered yes to this question, they described the illness and indicated the month and year when the illness had developed. Illnesses were later coded using ICD-10 classifications and whether the chronic condition was evident prior to giving birth to the child with a disability was also recorded.

2.3 Statistical Analyses

The data were weighted prior to analysis to account for the complex sampling design and weighted descriptive statistics are reported. Demographic and other variables were compared for both groups of parents (parents of children with developmental disabilities, parents of typically developing children). A chi-square test was used to test for significant associations between categorical variables and parental group. Mean SDQ total scores and age for both groups were compared using an independent samples t-test. Median equivalised income was compared for both groups using a non-parametric test. A 5% level of significance was used for all hypothesis tests. Because of the large sample size in this study, small differences between groups can be statistically significant. Cohen's *d* was used to evaluate effect size for numeric variables with Cohen's *d*=0.2 representing a small effect, 0.5 a medium effect and 0.8 a large effect. Cramer's *V* was used to evaluate effect size for categorical variables with Cramer's *V*=0.1 representing a weak association, 0.3 a moderate association and 0.5 a relatively strong association. A series of binary logistic regression analyses were carried out to predict CES-D score ≥ 7 (yes, no) using demographic variables, parental group, presence of chronic health conditions and behavior of the child as predictor variables. Odds ratios and associated 95% confidence intervals are reported. Goodness of fit was assessed using the Hosmer-Lemeshow chi-squared test. IBM SPSS Statistics Version 20 for Windows and SAS software Version 9.2 for Windows (SAS Institute, Inc.) were used to carry out the analysis.

3. Results

3.1 Group differences in socio-demographics, health and other factors

The socio-demographics of the primary caregiver are summarised in Table 2 for both groups of parents. Parents of children with disabilities were less likely to be

Depression and chronic health conditions

employed, have a partner in the home or a third level qualification and also had lower incomes. While the demographic characteristics reported in Table 2 were statistically significantly different for the two groups of parents ($p < 0.05$), effect sizes were small. Table 3 summarises the self-reported health status, depression, presence of a chronic condition and when this chronic condition developed for both groups of parents. The behaviour of the child, as measured by the SDQ total score is also given for both groups of parents. The characteristics reported in Table 3 were statistically significantly different for both groups of parents ($p < 0.05$) but effect sizes were small except in the case of the child's SDQ total scores (Cohen's $d=0.90$).

[Insert Table 2 & 3 About Here]

As can be seen in Table 3, a larger proportion of parents of children with disabilities had a score ≥ 7 on the CES-D (indicating possible depression); they rated their health as poorer, and were more likely to have an on-going chronic condition. Moreover, a larger percentage of these parents reported that these chronic conditions were evident before the birth of their child. The common chronic conditions included diseases of the respiratory system, musculoskeletal system and connective tissue and endocrine, nutritional and metabolic diseases. Similar rates of mental and behavioural disorders were reported for both groups of parents. Primary caregivers were also asked specifically if they had been treated for depression and 424 (68%) of the 627 parents of children with diagnosed developmental and/or learning disorders responded to this question. Of these, 6.8% reported being treated for depression which is considerably lower than the percentage of these parents with CES-D scores ≥ 7 (14.7%). 5811 (73%) of the 7941 parents of typically developing children responded to the question on treatment for depression. 6.2% reported being treated for depression compared to 8.9% of these parents with CES-D scores ≥ 7 . There was no significant difference between the percentage of parents of typically developing children who reported being treated for depression and the percentage of parents of children diagnosed with developmental disabilities (6.8% vs 6.2%, $p=0.61$).

3.2 Contribution of potential parenting, socio-demographic, child and health-related variables to risk of depression

Depression and chronic health conditions

A series of regression analyses were carried out to predict CES-D scores ≥ 7 (yes, no). The first model adjusted for age and gender of the primary caregiver only. After adjusting for age and gender, primary caregivers of children with developmental disabilities were found to have an increased risk of depression compared to parents of children without these disabilities (OR=1.83, 95% CI 1.43 to 2.35). The second model adjusted for age, gender and the presence of a chronic condition. Having a chronic condition explained some of the excess risk of depression for primary caregivers of children with developmental disabilities (OR=1.77, 95% CI 1.38, 2.27). The third model included age, gender, other demographic variables given in Table 2 and having a chronic condition. Having a child with developmental disabilities was associated with a higher risk of depression after adjusting for these variables (OR=1.73, 95% CI 1.33, 2.26) and the results of this model are presented in Table 4. The final model investigated whether the increased risk of depression remained after adjusting for the child's SDQ score. The association between having a child with disabilities and increased risk of depression was explained by adjusting for the child's SDQ total score (OR =1.07, 95% CI: 0.81, 1.42).

[Insert Table 4 About Here]

4. Discussion

In the Growing Up in Ireland Study, we confirmed that caring for a child with a developmental disability was associated with an increased risk of depression compared to caring for typically developing children. We investigated multiple potential sources of bias as a possible explanation for this finding and to our knowledge, it is the first study to show that this excess risk was still present after controlling for chronic health conditions and a range of socio-demographics. The excess risk was explained, however, by controlling for child problem behaviours. Compared to the prevalence rates for depression in the general population in (e.g., 8.5-9.5%) (Ayuso-Mateos et al., 2001; Kessler, Chiu, Demler, Merikangas, & Walters, 2005), the rates found in these particular parents was significantly higher at 14.7%. There was also a slightly higher prevalence of chronic medical conditions in these parents. Interestingly, the prevalence rate for depression was significantly lower than that reported in previous non-population based research (33%) (Gallagher, Phillips, Oliver, & Carroll, 2008; White & Hastings, 2004), suggesting there may be a

Depression and chronic health conditions

reporting bias in smaller studies. Moreover, while the prevalence rate of depression was significantly higher for these parents compared to parents of typically developing children (14.7% vs. 8.9%), self-reported treatment rates for depression were similar in both groups of parents (6.8% vs. 6.3%) suggesting that many parents of children with disabilities were not being treated for their depression. Perhaps one explanation for this is that the primary concern for these parents is the health and well-being of their child, which takes priority above their own health needs. However, others have found that primary care physicians are not well-equipped for screening for depression and more effective training is needed to improve detection rates (Ohtsuki et al., 2010). Overall, the results confirm that caring for children with development disabilities is associated with higher rates of depression and that this increased risk is independent of chronic health conditions.

In line with previous research, more problematic child behaviours accounted for the increased risk of depression in parents caring for children with developmental and/or learning disabilities (Anastopoulos, Guevremont, Shelton, & Dupaul, 1992; Bailey, Golden, Roberts, & Ford, 2007; Dunn, Burbine, Bowers, & Tantleff-Dunn, 2001; Resch et al., 2012). Although not previously studied as a potential confound, chronic health conditions, as expected, were associated with higher risk of depression. The association between physical health problems and depression in these parents has been reported elsewhere (Resch et al., 2012), but in the present study this risk was still evident even after controlling for these chronic conditions. Similarly, it is worth noting that even though pre-existing chronic conditions are associated with a greater predisposition for recurrence of depression (Burcusa & Iacono, 2007), with our two parenting groups differing along this dimension (e.g., 46.2 vs. 35.3%), the risk of depression was still elevated in these parents irrespective of whether or not they had a chronic condition before the birth of their child. Taken together, our data suggest that a large proportion of the risk for depression in these parenting families is attributed to caregiving context post diagnosis of the disability.

The current study has a number of limitations. First, the data are observational and the analysis conducted on data at one point in time. The high levels of depression observed in parents caring for children with developmental disabilities may be transitory, though there is evidence that higher levels of depression in this population persist over time (Dyson, 1993; Glidden & Schoolcraft, 2003). The data reported here are for parents of 9-year old children. These families are currently being followed up

Depression and chronic health conditions

as the child reaches their 13th birthday so the longitudinal design of this study will have the potential to explore whether there is a general worsening or alleviation of depression over time in these parents. Second, our physical health status was not objectively verified, but previous studies have confirmed the presence of poor physical health in these families (Brehaut et al., 2004). Finally, our depression scale was also self-report and a diagnostic clinical interview is perhaps the ideal but self-report measures are a common feature of population-based research.

In conclusion, this study has confirmed in a population-based sample the high prevalence rates of depression in parents caring for children with developmental disabilities. Only a small proportion of this elevated risk was explained by the presence of chronic health conditions, with child problem behaviours fully explaining the excess risk. However, our findings have implications for future research on depression in these parents, in that researchers need to consider the presence of co-morbidities as a potential explanatory factor. Moreover, given that poor mental health in these parents is associated with a battery of negative health outcomes, it is imperative that interventions are provided for treatment as recent evidence has found that depressive symptoms may not improve and may actually worsen over time for these parents (Barker et al., 2011). Finally, we also observed that while the prevalence rate of depression was significantly higher for these parents, self-reported treatment rates suggested many of these parents were not being treated for their depression. Therefore, it is necessary to increase the recognition rate of depression in these parents.

Acknowledgements

The authors would like to thank Dr Siobhan Howard, and Catherine Naughton for their helpful comments on earlier drafts of this manuscript.

References

- Anastopoulos, A. D., Guevremont, D. C., Shelton, T. L., & Dupaul, G. J. (1992). Parenting Stress among Families of Children with Attention-Deficit Hyperactivity Disorder. *Journal of Abnormal Child Psychology*, 20(5), 503-520. doi: Doi 10.1007/Bf00916812
- Alvarez, R.J. (2102). Relación entre los niveles de carga, la salud física autopercibida y los niveles de depresión en las cuidadoras principales de niños y jóvenes con autismo. Unpublished dissertation, Universidad Centroccidental Lisandro Alvarado, Venezuela
- Ayuso-Mateos, J. L., Vazquez-Barquero, J. L., Dowrick, C., Lehtinen, V., Dalgard, O. S., Casey, P., . Group, O. (2001). Depressive disorders in Europe: prevalence figures from the ODIN study. *British Journal of Psychiatry*, 179, 308-316.
- Bailey, D. B., Golden, R. N., Roberts, J., & Ford, A. (2007). Maternal depression and developmental disability: Research critique. *Mental Retardation and Developmental Disabilities Research Reviews*, 13(4), 321-329. doi: Doi 10.1002/Mrdd.20172
- Barker, E. T., Hartley, S. L., Seltzer, M. M., Floyd, F. J., Greenberg, J. S., & Orsmond, G. I. (2011). Trajectories of emotional well-being in mothers of adolescents and adults with autism. *Developmental Psychology*, 47(2), 551-561. doi: 10.1037/a0021268
- Barrow, S., & Harrison, R. A. (2005). Unsung heroes who put their lives at risk? Informal caring, health and neighbourhood attachment. *Journal of Public Health*, 27(3), 292-297. doi: DOI 10.1093/pubmed/fdi038
- Brehaut, J. C., Kohen, D. E., Raina, P., Walter, S. D., Russell, D. J., Swinton, M., . . . Rosenbaum, P. (2004). The health of primary caregivers of children with cerebral palsy: how does it compare with that of other Canadian caregivers? *Pediatrics*, 114(2), e182-191.
- Burcusa, S. L., & Iacono, W. G. (2007). Risk for recurrence in depression. *Clinical Psychol Review*, 27(8), 959-985. doi: 10.1016/j.cpr.2007.02.005
- Dunn, M. E., Burbine, T., Bowers, C. A., & Tantleff-Dunn, S. (2001). Moderators of stress in parents of children with autism. *Community Mental Health Journal*, 37(1), 39-52. doi: Doi 10.1023/A:1026592305436
- Dyson, L. (1993). Response to the presence of a child with disabilities: parental stress and family functioning over time. *American Journal of Mental Retardation*, 98(2), 207-218.
- Dyson, L., Edgar, E., & Crnic, K. (1989). Psychological predictors of adjustment by siblings of developmentally disabled children. *American Journal of Mental Retardation*, 94(3), 292-302.
- Eisenhower, A. S., Baker, B. L., & Blacher, J. (2005). Preschool children with intellectual disability: syndrome specificity, behaviour problems, and maternal well-being. *Journal of Intellectual Disability Research*, 49, 657-671. doi: DOI 10.1111/j.1365-2788.2005.00699.x
- Fisman, S., & Wolf, L. (1991). The handicapped child: psychological effects of parental, marital, and sibling relationships. *Psychiatric Clinics of North America*, 14(1), 199-217.
- Gallagher, S., Phillips, A. C., Drayson, M. T., & Carroll, D. (2009). Parental caregivers of children with developmental disabilities mount a poor antibody

- response to pneumococcal vaccination. *Brain Behavior and Immunity*, 23(3), 338-346. doi: 10.1016/j.bbi.2008.05.006
- Gallagher, S., Phillips, A. C., Oliver, C., & Carroll, D. (2008). Predictors of psychological morbidity in parents of children with intellectual disabilities. *J Pediatric Psychology*, 33(10), 1129-1136. doi: 10.1093/jpepsy/jsn040
- Gallagher, S., & Whiteley, J. (2012). Social support is associated with blood pressure responses in parents caring for children with developmental disabilities. *Research in Developmental Disabilities*, 33(6), 2099-2105. doi: 10.1016/j.ridd.2012.06.007
- Gallagher, S., & Whiteley, J. (2013). The association between stress and physical health in parents caring for children with intellectual disabilities is moderated by children's challenging behaviours. *Journal of Health Psychology*, 18(9), 1220-1231. doi: 10.1177/1359105312464672
- Glidden, L. M., & Schoolcraft, S. A. (2003). Depression: its trajectory and correlates in mothers rearing children with intellectual disability. *Journal of Intellectual Disability Research*, 47(Pt 4-5), 250-263.
- Goodman, R. (1997). The Strengths and Difficulties Questionnaire: a research note. *Journal of Child Psychology & Psychiatry*, 38(5), 581-586.
- Herring, S., Gray, K., Taffe, J., Tonge, B., Sweeney, D., & Einfeld, S. (2006). Behaviour and emotional problems in toddlers with pervasive developmental disorders and developmental delay: associations with parental mental health and family functioning. *Journal of Intellectual Disability Research*, 50(Pt 12), 874-882. doi: 10.1111/j.1365-2788.2006.00904.x
- Kahn, R. S., Brandt, D., & Whitaker, R. C. (2004). Combined effect of mothers' and fathers' mental health symptoms on children's behavioral and emotional well-being. *Archives of Pediatrics and Adolescent Medicine*, 158(8), 721-729. doi: 10.1001/archpedi.158.8.721
- Kessler, R. C., Chiu, W. T., Demler, O., Merikangas, K. R., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62(6), 617-627. doi: 10.1001/archpsyc.62.6.617
- Lovell, B., Moss, M., & Wetherell, M. A. (2012). With a little help from my friends: psychological, endocrine and health corollaries of social support in parental caregivers of children with autism or ADHD. *Research in Developmental Disabilities*, 33(2), 682-687. doi: 10.1016/j.ridd.2011.11.014
- Moussavi, S., Chatterji, S., Verdes, E., Tandon, A., Patel, V., & Ustun, B. (2007). Depression, chronic diseases, and decrements in health: results from the World Health Surveys. *Lancet*, 370(9590), 851-858. doi: 10.1016/S0140-6736(07)61415-9
- Murray, A., McCrory, C., Thornton, M., Williams, J., Quail, A., Swords, L., . . . Harris, E. (2011). Growing up in Ireland: Design, instrumentation and procedures for the child cohort. *Technical Report Number 1. Dublin: Office of the Minister for Children.*
- Ohtsuki, T., Inagaki, M., Oikawa, Y., Saitoh, A., Kurosawa, M., Muramatsu, K., & Yamada, M. (2010). Multiple barriers against successful care provision for depressed patients in general internal medicine in a Japanese rural hospital: a cross-sectional study. *Biomedical Central Psychiatry*, 10, 30. doi: 10.1186/1471-244X-10-30
- Pilowsky, D. J., Wickramaratne, P., Nomura, Y., & Weissman, M. M. (2006). Family discord, parental depression, and psychopathology in offspring: 20-year

Depression and chronic health conditions

- follow-up. *Journal of American Academy of Child Adolescent Psychiatry*, 45(4), 452-460. doi: 10.1097/01.chi.0000198592.23078.8d
- Radloff, L. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychology Measures*, 1, 385-401.
- Resch, J. A., Elliott, T. R., & Benz, M. R. (2012). Depression Among Parents of Children With Disabilities. *Families Systems & Health*, 30(4), 291-301. doi: Doi 10.1037/A0030366
- Singer, G. H. (2006). Meta-analysis of comparative studies of depression in mothers of children with and without developmental disabilities. *American Journal of Mental Retardation*, 111(3), 155-169. doi: 10.1352/0895-8017(2006)111[155:MOCSOD]2.0.CO;2
- Talley, R. C., & Crews, J. E. (2007). Framing the public health of caregiving. (vol 97, pg 224, 2007). *American Journal of Public Health*, 97(3), 393-393. doi: Doi 10.2105/Ajph.2004.059337
- White, N., & Hastings, R. P. (2004). Social and professional support for parents of adolescents with severe intellectual disabilities. *Journal of Applied Research in Intellectual Disabilities*, 17(3), 181-190. doi: DOI 10.1111/j.1468-3148.2004.00197.x

Table 1. Diagnosed disorders (829 disorders diagnosed in 627 children)

Disorder	n (%)
Dyslexia	289 (46%)
Speech and language difficulty	166 (26%)
Slow progress	125 (20%)
Dyspraxia	73 (12%)
ADHD	71 (11%)
Autism/Asperger's	54 (9%)
Other	51 (8%)

Depression and chronic health conditions

Table 2. Weighted descriptive statistics of the demographics of the primary caregiver

Characteristic	Primary caregivers of children without developmental disabilities (n=7941)			Primary caregivers of children with developmental disabilities (n=627)			p-value
	No in each Category	%	Mean (SD) or Median (IQR)	No in each Category	%	Mean (SD) or Median (IQR)	
Age			39.2 (5.65)			39.8 (5.94)	0.006
Gender							
Female	7758	97.7		624	99.5		0.003
Male	183	2.3		3	0.5		
Employment status							
Employee	3789	47.7		224	35.6		<0.001
Home duties/retired	3050	38.4		289	46.1		
Self-employed	528	6.6		46	7.3		
Student	329	4.2		35	5.6		
Unemployed	220	2.8		32	5.1		
Other	25	0.3		2	0.3		
Partner in the home							
Yes	6520	82.1		495	78.9		0.049
No	1421	17.9		132	21.1		
Highest Level of Education							
Tertiary	2666	33.5		172	27.6		<0.001
Secondary	4783	60.3		398	63.4		
Primary	492	6.2		57	9.1		
Equivalised annual income	7418		16755 (11425.2)	589		15421 (11537.6)	0.02

Table 3. Health characteristics of the primary caregiver and behaviour of the child

Characteristic	Primary caregivers of children without developmental disabilities (n=7941)			Primary caregivers of children with developmental disabilities (n=627)			p-value
	No in each Category	%	Mean (SD)	No in each Category	%	Mean (SD)	
CES-D score ≥ 7	634	8.9		83	14.7		<0.001
Self-report of health							
Excellent	2489	31.3		160	25.5		0.003
Very good	3188	40.1		255	40.6		
Good	1722	21.7		156	25.0		
Fair	469	5.9		44	7.0		
Poor	73	0.9		12	1.9		
On-going chronic conditions							
Physical conditions	894	11.3		88	14.1		0.03
Mental conditions	178	2.2		15	2.4		
None	6868	86.5		523	83.4		
Chronic condition developed before birth of child	372	35.3		50	46.2		0.03
Child's SDQ Total score			7.6 (5.05)			12.7 (6.20)	<0.001

Depression and chronic health conditions

Table 4. Association between chronic health, demographic variables and having a child with developmental disabilities with risk of depression in the primary caregiver.

Variable	Odds Ratio	95% Confidence Interval
Gender		
Female	1.00	Referent
Male	0.56	0.26, 1.21
Age		
	0.98	0.97, 0.99
Partner in the home		
Yes	1.00	Referent
No	2.45	2.02, 2.97
Education		
Tertiary	1.00	Referent
Secondary	1.83	1.29, 2.60
Primary	1.69	1.37, 2.09
Work		
Employed	1.00	Referent
Home duties	1.92	1.34, 2.76
Other	2.05	1.43, 2.94
Chronic illness		
None	1.00	Referent
Since after birth of child	2.42	1.91, 3.05
Since before birth of child	2.06	1.51, 2.83
Child with developmental disabilities		
No	1.00	Referent
Yes	1.73	1.33, 2.26
Income		
Highest	1.00	Referent
4 th quintile	1.18	0.86, 1.61
3 rd quintile	1.33	0.98, 1.80
2 nd quintile	1.64	1.22, 2.21
Lowest	1.84	1.35, 2.50

