

This is an Accepted Manuscript of an article published by Taylor & Francis Group in Journal of Mental Health Research in Intellectual Disabilities on 13/04/2019, available online: <https://doi.org/10.1080/19315864.2019.1595233>

Article title

Identification of Post-Traumatic Stress Disorder in Individuals with Autism Spectrum Disorder and Intellectual Disability – A Systematic Review

Journal name

Journal of Mental Health Research in Intellectual Disabilities

Corresponding/first author

Kildahl, Arvid Nikolai – uxarvk@ous-hf.no

Regional Section Mental Health, Intellectual Disabilities/Autism, Oslo University Hospital and NevSom Norwegian Centre of Expertise for Neurodevelopmental Disorders and Hypersomnias, Oslo University Hospital

Co-authors

Bakken, Trine Lise – uxtlba@ous-hf.no

Regional Section Mental Health, Intellectual Disabilities/Autism, Oslo University Hospital

Iversen, Trine Elisabeth – uxivtr@ous-hf.no

Regional Section Mental Health, Intellectual Disabilities/Autism, Oslo University Hospital

Helverschou, Sissel Berge – shelvers@ous-hf.no

NevSom Norwegian Centre of Expertise for Neurodevelopmental Disorders and

Hypersomnias, Oslo University Hospital

Funding details and disclosure statement

The current study was funded through the authors' employment as clinicians. There are no conflicts of interest to disclose.

Keywords

Post-traumatic stress disorder, PTSD, Autism spectrum disorder, Intellectual disability, Trauma, Assessment

Acknowledgements

The first author would like to thank Julie Nordgaard, Ida Margrethe Nielsen, Helena Sandgreen, Marlene Buch Pedersen, Anja Friis Elliot, Therese Torgersen Bigseth, Henny Dyrberg, Sune Straszek, Cecilie Vinther Hansen, and especially Povl Munk-Jørgensen for their helpful questions and comments to an earlier version of this manuscript.

Abstract

Introduction

Autism Spectrum Disorder (ASD) and Intellectual Disability (ID) seem to influence risk of and vulnerability to exposure to trauma and adverse events. While assessment of psychiatric disorder in ASD and ID generally is challenging, identification of Post-traumatic stress disorder (PTSD) seems particularly so, and knowledge does not seem easily accessible.

Methods

This article provides a systematic review of studies describing trauma reactions in individuals with both ASD and ID, including studies involving any single case with the combination of

ASD, ID, and PTSD. To systematically explore PTSD symptom presentation in the group, all reported symptoms from studies were assigned by DSM 5 criteria.

Results

Eighteen studies met the inclusion criteria, eight group studies and ten case studies.

Assessment methodology in studies varied, as did the format of symptom report. DSM 5 criteria provided a useful framework for integrating findings across studies, indicating that PTSD may be identified in individuals with ASD and ID. However, symptoms involving alterations in arousal and negative alterations in thought and behavior seem more easily identified than symptoms of re-experiencing and avoidance.

Conclusions

There is an urgent need to identify behavioral equivalents to PTSD symptoms in this group, making it possible to identify warning signs of trauma and abuse even if such incidents are not known to family or professional carers.

Introduction

Forty-five percent of individuals with Autism Spectrum Disorder (ASD) are estimated to have an Intellectual Disability (ID) (Lai, Lombardo & Baron-Cohen, 2014). These individuals seem particularly vulnerable to developing psychiatric disorder (Bakken et al., 2010; Bakken, Helverschou, Høidal & Martinsen, 2016), while assessments are challenging. Because individuals with ASD and ID have difficulties in self-report (Helverschou, Bakken & Martinsen, 2011), assessments frequently have to rely on information from family members or professional carers, along with observation and interpretation of behavioral equivalents of psychiatric symptoms (Underwood, McCarthy, Chaplin & Bertelli, 2015; Helverschou et al., 2011; Bakken, Friis, Lovoll, Smeby & Martinsen, 2007). This may involve identification of both typical and atypical symptoms (Helverschou & Martinsen, 2011; Bakken et al., 2007; Mohiuddin et al., 2011). Atypical symptoms appear to be more frequent with increasing levels of ID, as severe or profound ID often is associated with having more limited repertoires of communication and behavior (Fletcher, Barnhill & Cooper, 2016; Myrbakk & von Tetzchner, 2008).

Measures of Post-Traumatic Stress Disorder (PTSD) have rarely been included in studies of psychiatric co-morbidity in ASD and ID (Bakken et al., 2010). However, individuals with ASD and ID seem to be at increased risk of falling victim to violence (Sullivan & Knutson, 2000; Jones et al., 2012; Mandell, Walrath, Manteuffel, Sgro & Pinto-Martin, 2005; Duan et al., 2015), sexual abuse (Gotby et al., 2018; Hershkowitz, Lamb & Horowitz, 2007; Mandell et al., 2005; Sullivan & Knutson, 2000), maltreatment/neglect (Dinkler et al., 2017; McDonnell et al., 2018; Chan, Lo & Ip, 2018; Sullivan & Knutson, 2000; Turner, Vanderminden, Finkelhor, Hamby & Shattuck, 2011; Chan & Lam, 2016), and bullying (Hoover & Kaufman, 2018; Sullivan & Knutson, 2000; Hoover, 2015). McDonnell et al.

(2018) found that children with ASD and ID, or either of these conditions alone, were at increased risk of maltreatment. While reports of maltreatment were similar across the three groups, substantiated maltreatment was more frequent in ID only, suggesting that reports of maltreatment are more challenging to substantiate in individuals with ASD. Compared to other children experiencing maltreatment, children with ASD and ID seemed to be at risk for more frequent and complex maltreatment. Dinkler et al. (2017) found that having multiple neurodevelopmental disorders, for instance both ASD and ID, was associated with an increased risk of maltreatment relative to having only one of these conditions.

Lower IQ is associated with increased risk of exposure to adverse events and development of PTSD both in the general population (Breslau, Lucia & Alvarado, 2006; Macklin et al., 1998), and within the ID group (Tureck, Matson, Cervantes & Konst, 2014). There are also suggestions that inherent features of ASD may increase risk of PTSD following an adverse event (Kerns, Newschaffer & Berkowitz, 2015; Haruvi-Lamdan, Horesh & Golan, 2018). The majority of studies on PTSD in ASD, however, have used ID as an exclusion criterion (Rumball, 2018), limiting current knowledge on PTSD in individuals with both ASD and ID.

Findings on PTSD in individuals with ID or ASD alone are not necessarily generalizable to the group having both ASD and ID (Matson & Cervantes, 2014). This underlines the need for specific knowledge concerning PTSD in individuals with both ASD and ID. While there have been recent reviews concerning PTSD in ASD (Rumball, 2018; Hoover, 2015) and ID (Mevisen, Didden & de Jongh, 2015; Wigham & Emerson, 2015), no study to date has reviewed current knowledge regarding identification of PTSD in the group with both ASD and ID.

In this review, the following research question is addressed: how does PTSD present in individuals with both ASD and ID, and how may it be identified? The objective of the study is to identify knowledge gaps regarding presentation and identification of PTSD in individuals with ASD and ID.

Methods

Protocol and registration

A systematic review was undertaken according to the principles outlined in the preferred reporting guidelines for systematic reviews and meta-analyses (Moher et al., 2009). A systematic review protocol was registered prior to data extraction (https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=103885).

Search

Three search groupings were created; one for PTSD (“post-traumatic stress disorder” OR “posttraumatic stress disorder” OR “post traumatic stress disorder” OR PTS* OR “Stress Disorder” OR traum* OR abuse), one for ASD (asd OR autis* OR Asperger* OR PDD-NOS OR “childhood disintegrative disorder” OR “pervasive developmental disorder”), and one for ID (“intellectual disability” OR “learning disability” OR “developmental disability” OR “mental retardation”). Searches were performed in PsychInfo, PubMed, Medline, Embase and PILOTS. Reference lists from included studies as well as previous reviews in related areas were scrutinized. Google scholar was used for additional searches, but yielded few further results. Search was limited to publications in English after 1980, as this was the year PTSD was first included in the DSM (American Psychiatric Association, 1980). The search was finalized on July 15th 2018.

Eligibility criteria and study selection

Any study involving specific cases describing symptoms of PTSD in one or more individuals with ASD and ID was included, both case and group-level studies. Because of the inherent challenges in diagnosing PTSD in the group, papers describing reactions to trauma or adverse events were included even if they did not specify that PTSD had been diagnosed. Conference abstracts, book chapters and similar were excluded, as were studies not published in English.

Data Collection and Risk of Bias

Because the included studies were few and heterogeneous, a majority being case studies, it was decided to utilize a descriptive, narrative and explorative methodology to synthesize data, organizing reported symptoms by DSM 5 diagnostic criteria (see table 1). This data extraction and synthesis was performed by the first author and systematically quality checked by the third author, both experienced clinicians with 9+ years of experience working with mental health in ASD/ID. There were few disagreements, but these were discussed until consensus was reached. Adaptions of criteria from the Diagnostic Manual – Intellectual Disability 2 chapter on trauma and stressor-related disorders (McCarthy, Blanco, Gaus, Razza & Tomasulo, 2016), were used for interpretational support. Original wording from studies is retained and presented in table 2 and 3 to make the assignation of symptoms transparent.

[Table 1 approximately here]

Risk of bias for individual studies was assessed during data extraction. The main source of bias identified was the risk of studies not reporting all symptoms present. Publication bias may have affected risk of bias across studies, by making less typical presentations of PTSD less likely to be identified and reported. There are also more general issues in the study of

trauma in ASD and ID that may have affected risk of bias. These are primarily related to varying definitions and methodology across studies, but also to the challenges in verifying information about mistreatment and abuse inherent to the group (Leeb, Bitsko, Merrick & Armour, 2012; Sullivan, 2009).

Results

Study selection

Study selection is described in figure 1. Initial reviews were by title and abstract only. Studies were excluded for not meeting inclusion criteria, not being in English, not being from peer-reviewed journals, or not reporting on patient data. Twenty-eight articles were retrieved for full text review, which led to the exclusion of a further 10 articles. These were excluded for not meeting inclusion criteria, for instance by excluding individuals with ID, or not reporting specifically whether individuals with ID also had ASD or vice versa. Finally, 18 articles were included in the review, 8 group studies and 10 case studies. Characteristics and symptoms from group studies are presented in table 2, with case characteristics and symptoms from case studies in table 3.

[Figure 1 approximately here]

Study characteristics

Only three group studies investigated diagnosed PTSD (Methar & Mukaddes, 2011; de Bruin, Ferdinand, Meester, de Nijs & Verheij, 2007; Taylor & Gotham, 2016), with only one study identifying any cases (Methar and Mukaddes, 2011). This study included individuals with ASD and a wide range of IQ scores, from severe ID (26.1%), moderate ID (39.1%), and mild ID (7.2%), to non-ID (27.5%). Thirteen of eighteen individuals with PTSD in the study had an

ID, but symptom presentation was not analyzed or reported separately for this group. The three studies all utilized standardized assessment tools whose psychometric properties in the assessment of PTSD in ASD/ID have not been systematically studied.

The five remaining group studies did not involve diagnosed PTSD, but included individuals with ASD and ID having experienced abuse or other adverse events. Three studies investigated consequences of abuse in groups with severe ID (Murphy, O'Callaghan & Clare, 2007; Rowsell, Clare & Murhpy, 2013) or multiple handicaps (Ammerman, van Hasselt, Hersen, McGonigle & Lubetsky, 1989), but did not report separate analyses for included individuals with ASD. Two studies investigated correlates of either abuse (Howlin & Clements, 1995) or an earthquake (Valenti et al., 2012) in groups with ASD across the IQ range, but did not differentiate by presence or level of ID in analyses.

[Table 2 approximately here]

Only two single-case studies focused specifically on PTSD in ASD with ID (Carrigan & Allez, 2016; Cook et al., 1993). Remaining case studies presented one or more cases with PTSD, ASD and ID among other cases involving PTSD with either ID or ASD. Sufficient symptoms to substantiate PTSD diagnosis according to DSM 5 criteria were reported in only four of the 15 cases (Carrigan & Allez, 2016; Mevissen, Lievegoed, Seubert & de Jongh, 2012; Ryan, 1994; Cook et al., 1993), while in two cases only aggression and self-injurious behavior were reported (Carvill & Marston, 2002). Lack of systematic reporting of symptoms in the included studies is likely to affect risk of bias.

[Table 3 approximately here]

Not all reported traumatic experiences clearly adhered to group A criteria (American Psychiatric Association, 2013). These are given in *italic* in the tables. The Diagnostic Manual – Intellectual Disability 2 (McCarthy et al., 2016) suggests that the threshold is lowered for vulnerability and consequent development of PTSD in individuals with ID. Though possibly not within a narrow interpretation of DSM 5 criteria, these adverse events were therefore still assigned to group A.

Re-experiencing and avoidance were the most rarely reported symptoms from both group and case studies. Reported duration of symptoms ranged from 6-12 months (Valenti et al., 2012) up to sixteen years (Ryan, 1994), with the exception of one case being referred after three months (Mevisen, Lievegoed, Seubert & de Jongh, 2011). All group and case studies identifying trauma reactions or PTSD reported distress and/or functional impairment associated with the adverse events.

Discussion

There seems to be little consensus on how to identify PTSD in individuals with ASD and ID. The reviewed studies vary widely in their assessment methodology, making it a challenge to draw comparisons across studies beyond surface symptom descriptions. DSM 5 criteria provided a useful framework for integrating findings across studies. The results indicate that PTSD symptoms from all symptom groups may be identified in individuals with ASD and ID. However, symptoms involving alterations in arousal and negative alterations in thought and behavior seem more easily identified, while fewer studies reported symptoms of re-experiencing and avoidance.

Re-experiencing involving classic flashbacks (van der Kolk, 2014) was only described in two cases involving individuals with good verbal abilities. The understanding of more unspecific behavior as re-experiencing seemed to depend on the individuals' previous trauma being known to people around them, and behavior being interpreted in the light of this. Most individuals with ASD and ID may not be able to report abuse or other adverse events (Helverschou et al., 2011). Sometimes abuse is only revealed or discovered years after its occurrence (Rowell et al., 2013), even in cases involving good verbal abilities (Carrigan & Allez, 2016). This may have contributed to two of the studies investigating diagnoses of PTSD not identifying any cases (Taylor & Gotham, 2016; de Bruin et al., 2007). Brewin (2015) suggests trauma memories are stored in an involuntary perceptual memory system distinct from ordinary episodic memory. Sensory-based processing of an event leads to the formation of poorly contextualized and disjointed memories, resulting in the development of intrusive trauma memories and symptoms of re-experiencing (Halligan, Clark & Ehlers, 2002; Whalley et al., 2013). It thus seems unlikely that symptoms of re-experiencing are dependent on a certain level of cognitive or verbal ability. Sparseness of reports seems more likely to be explained by a combination of the intra-psychic nature of these symptoms and patients' lack of verbal abilities.

A majority of reviewed studies describe examples of alterations in arousal and negative alterations in thoughts and emotions, symptoms that are relatively uncomplicated to observe. However, these symptoms are not specific to PTSD and may be interpreted as signs of challenging behavior, anxiety disorder, or affective disorder in the absence of known exposure to trauma. Avoidance, which was rarely reported, may be at risk of being misinterpreted as challenging behavior or noncompliance (Carrigan & Allez, 2016; Ryan, 1994). Treatment of avoidance symptoms in the general population involves careful self-

monitoring to avoid triggering symptoms of re-experiencing (van der Kolk, 2014).

Misinterpretation of avoidance symptoms by families or professional carers may thus have harmful consequences. Lower expert consensus has been reported for expressions of re-experiencing and avoidance symptoms in individuals with ID than for other PTSD symptoms (Rittmannsberger, Kocman, Weber & Lueger-Schuster, 2018), underlining the need for further knowledge and improved identification of these symptoms.

Two group studies and six cases found trauma or PTSD to be associated with an apparent increase of ASD symptoms, including restricted interests, stereotypic movement and motor mannerisms (Mehtar & Mukaddes, 2011; Murphy et al., 2007). It is well-known that psychiatric disorder in ASD and ID may entail such an aggravation of ASD symptoms, including social and communicative challenges and stereotypical behavior (Helverschou et al., 2011; Underwood, 2015). Aggravation of ASD symptoms may be associated with mood-related aspects of PTSD, as descriptions seem similar to descriptions of affective disorders in ASD and ID (Underwood et al., 2015). Alternatively, it may also be associated with avoidance or individuals with ASD and ID attempting to manage experiences of altered arousal. Such an aggravation may also be a more unspecific sign of distress and discomfort in individuals with ASD and ID. Current results indicate that these symptoms are related to PTSD, but further research is required to identify the nature of this relation.

If families or professional carers had knowledge of symptoms of PTSD displayed by individuals with ASD and ID, it is likely that such symptoms would be detected earlier, possibly even while abuse or trauma is still ongoing. Reviewed case studies indicate that detection and identification is possible, even in individuals with poor verbal abilities (e.g. Rowsell et al., 2013). However, identification seems to involve the need for thorough

assessment of behavioral change resembling PTSD (Murphy et al., 2007; Rowsell et al., 2013; Howlin & Clements, 1995; Carvill & Marston, 2002), while the current review indicates that symptoms of altered arousal and negative alterations of thoughts and emotions may be more easily identifiable than other symptoms. Simultaneous changes in both of these areas may therefore be sufficient to warrant further investigation of other PTSD symptoms, involving the use of multiple informers (Carvill & Marston, 2002; Howlin & Clements, 1995) and sensitive interpretation of behavior change (Barol & Seubert, 2010).

Though there is no consensus regarding the use of standardized assessment tools not especially adapted to the group (Underwood et al., 2015), there are findings suggesting their usefulness when used by clinicians knowledgeable in ASD mental health issues (Kildahl, Bakken, Holm & Helverschou, 2017; Mehtar & Mukaddes, 2011; Hoover, 2015). However, when it comes to symptoms of a more intra-psychic nature, parental or carer report cannot fully replace self-report (Kildahl et al., 2017). Though there have been recent, promising approaches (Hoover & Romero, 2019; Hall, Jobson & Langdon, 2014), there is currently a lack of appropriate self-report tools for individuals with ASD and ID for trauma exposure and PTSD symptoms.

Search for the current review resulted in a high number of false positives. It thus seems unlikely that central studies were missed. Wide inclusion criteria resulted in including studies either not identifying cases, or possibly confounding data as analyses included individuals without either ASD or ID. No identified group study focused specifically on the topic for this review, and in only two group studies did individuals with ASD, ID and trauma reactions constitute the majority (Methar & Mukaddes, 2011; Howlin & Clements, 1995). For the case studies, narrowing of inclusion criteria might have resulted in only two studies being included

(Carrigan & Allez, 2016; Cook et al., 1993), potentially overlooking clinically useful information from remaining case descriptions. The wide range of studies included underlines the current lack of coherent and systematic assessment methodology in the field.

To date, there has been no group study on treatment of PTSD in this group, but case studies have reported examples of successfully adapting standard PTSD treatments including Cognitive Behavior Therapy (CBT) and Eye Movement Desensitization and Reprocessing (Barol & Seubert, 2010; Carrigan & Allez, 2016; Mevissen, Lievegoed & de Jongh, 2011; Mevissen, Lievegoed, Seubert, et al., 2011; Mevissen et al., 2012; Bakken et al., 2014). CBT shows promising results for treatment of anxiety disorders in general in individuals with ASD and good verbal skills (Weston, Hodgekins & Langdon, 2016; Lang, Register, Lauderdale, Ashbaugh & Haring, 2010), and may be further adapted and combined with other interventions in individuals with ASD and ID (Moskowitz et al., 2017).

Abuse and other adverse events may lead to long-lasting psychological damage, affecting the lives of individuals with ASD and ID and their families for years (Valenti et al., 2012; Murphy et al., 2007; Rowsell et al., 2013; Howlin & Clements, 1995; O'Callaghan, Murphy & Clare, 2003). Murphy et al. (2007) reported participants having *somewhat recovered* in their daily life functioning years after abuse, while Rowsell et al. (2013) maintained that psychological functioning remained severely compromised in the same sample. There are also indications that bullying may be associated with increased risk of suicidal ideation in individuals with ASD, irrespective of intellectual functioning (Mayes, Gorman, Hillwig-Garcia & Syed, 2013). Individuals with ASD frequently show poor outcomes in adulthood (Howlin & Magiati, 2017), and improved identification and treatment of PTSD may be one aspect of improving mental health and quality of life for these individuals.

Limitations

The included studies involved varying approaches to assessment and reporting of PTSD symptoms and were challenging to compare beyond surface symptom descriptions. Several case studies reporting PTSD diagnoses did not report sufficient symptoms to substantiate this, and consequently, lists of reviewed symptoms are non exhaustive. However, absence of symptoms from current reports is not necessarily due to symptoms being absent in this group, as current lack of knowledge may have contributed to symptoms being overlooked, misinterpreted, or simply not reported. None of the group studies focused specifically on PTSD in individuals with ASD and ID, even if all of them included individuals with ASD and ID. Data from these studies were not reported separately for individuals with ASD and ID and in only one study did this group constitute the majority. Findings regarding symptom expressions from these studies must therefore be interpreted with care in the context of the current review.

Conclusions

The current review shows that PTSD may be identified in individuals with ASD and ID. Symptoms involving alterations in arousal and negative alterations in thought and behavior seem to be more easily identified, while fewer studies reported symptoms of re-experiencing and avoidance. The latter seem more challenging to identify in this group, which is likely to be due to their intra-psychic nature and the group's difficulties in understanding and communicating about their inner states.

Future studies on PTSD in individuals with ASD and ID would be recommended to employ a more systematic approach to the identification and report of PTSD symptoms, making them

comparable across studies and laying the groundwork necessary for future group studies. Comprehensive assessments involving systematic assessment tools, use of multiple informers and gathering data also from other sources is likely to improve the strength and generalizability of data. Expression of PTSD is likely to vary across the ID spectrum, and there is a need for future studies to differentiate between various levels of ID.

References

- American Psychiatric Association. (1980). *Diagnostic and statistical manual of mental disorders* (3rd ed.). Washington, DC: American Psychiatric Association.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing
- Ammerman, R. T., van Hasselt, V. B., Hersen, M., McGonigle, J. J., & Lubetsky, M. J. (1989). Abuse and neglect in psychiatrically hospitalized multihandicapped children. *Child Abuse & Neglect, 13*, 335-343.
- Bakken, T. L., Helverschou, S. B., Eilertsen, D. E., Heggelund, T., Myrbakk, E., & Martinsen, H. (2010). Psychiatric disorders in adolescents and adults with autism and intellectual disability: A representative study in one county in Norway. *Research in Developmental Disabilities, 31* (6), 1669-1677.
- Bakken, T. L., Friis, S., Lovoll, S., Smeby, N. A., & Martinsen, H. (2007). Behavioral disorganization as an indicator of psychosis in adults with intellectual disability and autism. *Mental Health Aspects of Developmental Disabilities, 10*(2), 37-46.
- Bakken, T. L., Gjersoe, V., Matre, E., Kristiansen, T., Ro, A., Tveter, A. L., ... Kildahl, A. N. (2014). PTSD in adults with intellectual disabilities: stabilisation during inpatient stay. *Advances in Mental Health and Intellectual Disabilities, 8*(4), 237-247.

Bakken, T. L., Helverschou, S. B., Høidal, S. H., & Martinsen, H. (2016). Chapter 11. Mental illness with intellectual disabilities and autism spectrum disorders. In C. Hemmings and N. Bouras (Eds.), *Psychiatric and behavioural disorders in intellectual and developmental disabilities* (pp. 119-128). Cambridge: Cambridge University Press.

Barol, B. I. & Seubert, A. (2010). Stepping stones: EMDR treatment of individuals with intellectual and developmental disabilities and challenging behavior. *Journal of EMDR Practice and Research*, 4(4), 156-169.

Breslau, N., Lucia, V. C., & Alvarado, G. F. (2006). Intelligence and other predisposing factors in exposure to trauma and posttraumatic stress disorder: A follow-up study at age 17 years. *Archives of General Psychiatry*, 63(11), 1238-1245.

Brewin, C. R. (2015). Re-experiencing traumatic events in PTSD: new avenues in research on intrusive memories and flashbacks. *European Journal of Psychotraumatology*, 6(1), 27180. <https://doi.org/10.3402/ejpt.v6.27180>

Carrigan, N., & Allez, K. (2016). Cognitive behaviour therapy for post-traumatic stress disorder in a person with an autism spectrum condition and intellectual disability: A case study. *Journal of Applied Research in Intellectual Disabilities*, 30(2), 326-335.

Carvill, S., and Marston, G. (2002). People with intellectual disability, sensory impairments and behaviour disorder: a case series. *Journal of Intellectual Disability Research*, 46(3), 264-272.

Chan, K. K. S., & Lam, C. B. (2016) Parental maltreatment of children with autism spectrum disorder: A developmental-ecological analysis. *Research in Autism Spectrum Disorders*, 32, 106-114.

Chan, K. L., Lo, C. K. M., & Ip, P. (2018). Associating disabilities, school environments, and child victimization. *Child Abuse & Neglect*, 83, 21-30.

Cook, E. H., Kieffer, J. E., Charak, D. A., and Leventhal, B. L. (1993). Autistic disorder and post-traumatic stress disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 32(6), 1292-1294.

de Bruin, E. I., Ferdinand, R. F., Meester, S., de Nijs, P. F., and Verheij, F. (2007). High rates of psychiatric co-morbidity in PDD-NOS. *Journal of Autism and Developmental Disorders*, 37(5), 877-886.

Dinkler, L., Lundström, S., Gajwani, R., Lichtenstein, P., Gillberg, C., & Minnis, H. (2017). Maltreatment-associated neurodevelopmental disorders: a co-twin control analysis. *The Journal of Child Psychology and Psychiatry*, 58(6), 691-701.

Duan, G., Chen, J., Zhang, W., Yu, B., Jin, Y., Wang, Y., & Yao, M. (2015). Physical maltreatment of children with autism in Henan province in China: A cross-sectional study. *Child Abuse & Neglect*, 48, 140–147.

Fletcher, R. J., Barnhill, J., & Cooper, S.-A. (2016). *DM-ID 2. Diagnostic Manual – Intellectual Disability: A Textbook of Diagnosis of Mental Disorders in Persons with*

Intellectual Disability. Kingston, New York: NADD - National Association for the Dually Diagnosed.

Gotby, V. O., Lichtenstein, P., Långström, N., & Pettersson, E. (2018). Childhood neurodevelopmental disorders and risk of coercive sexual victimization in childhood and adolescence – a population-based prospective twin study. *The Journal of Child Psychology and Psychiatry*, 59(9), 957-965.

Hall, J. C., Jobson, L., & Langdon, P. E. (2014). Measuring symptoms of post-traumatic stress disorder in people with intellectual disabilities: The development and psychometric properties of the Impact of Event Scale-Intellectual Disabilities (IES-IDs). *British Journal of Clinical Psychology*, 53(3), 315-332.

Halligan, S. L., Clark, D. M., & Ehlers, A. (2002). Cognitive processing, memory, and the development of PTSD symptoms: two experimental analogue studies. *Journal of Behavior Therapy and Experimental Psychiatry*, 33(2), 73–89.

Haruvi-Lamdan, N., Horesh, D., & Golan, O. (2018). PTSD and autism spectrum disorder: Co-morbidity, gaps in research and potential shared mechanisms. *Psychological Trauma: Theory, Research, Practice, and Policy*, 10(3), 290-299.

Helverschou, S. B., Bakken, T. L., & Martinsen, H. (2011). Psychiatric disorders in people with autism spectrum disorders: Phenomenology and recognition. In J.L. Matson, P. Sturmey (Eds.), *International Handbook of Autism and Pervasive Developmental Disorders* (pp.53-74), New York: Springer.

Helverschou, S. B. & Martinsen, H. (2011). Anxiety in people diagnosed with autism and intellectual disability: Recognition and phenomenology. *Research in Autism Spectrum disorders, 5*, 377-387.

Hershkowitz, I., Lamb, M. E., & Horowitz, D. (2007). Victimization of children with disabilities. *American Journal of Orthopsychiatry, 77*(4), 629–635.

Hoover, D. W. (2015). The Effects of Psychological Trauma on Children with Autism Spectrum Disorders: a Research Review. *Review Journal of Autism and Developmental Disorders, 2*(3), 287-299.

Hoover, D. W. & Kaufman, J. (2018). Adverse childhood experiences in children with autism spectrum disorder. *Current Opinion in Psychiatry, 31*(2), 128-132.

Hoover, D. W. & Romero, E. M. G. (2019). The interactive trauma scale: A web-based measure for children with autism. *Journal of Autism and Developmental Disorders*, <https://doi.org/10.1007/s10803-018-03864-3>

Howlin, P. & Magiati, I. (2017). Autism spectrum disorder: outcomes in adulthood. *Current Opinion in Psychiatry, 30*(2), 69-76.

Howlin, P. & Clements, J. (1995). Is it possible to assess the impact of abuse on children with pervasive developmental disorders? *Journal of Autism and Developmental Disorders, 25*(4), 337-354.

Jones, L., Bellis, M. A., Wood, S., Hughes, K., McCoy, E., Eckley, L., Bates, G., ... Officer, A. (2012). Prevalence and risk of violence against children with disabilities: a systematic review and meta-analysis of observational studies. *Lancet*, *380*, 899–907.

Kerns, C. M., Newschaffer, C. J., & Berkowitz, S. J. (2015). Traumatic childhood events and autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *45*(11), 3475–3486.

Kildahl, A. N., Bakken, T. L., Holm, O. H., & Helverschou, S. B. (2017). Assessment of psychosis in ASD/ID: a case study. *Advances in Mental Health and Intellectual Disabilities*, *11*(1), 17-23.

King, R. (2010). Commentary: complex post-traumatic stress disorder: implications for individuals with autism spectrum disorders – part I. *Journal on Developmental Disabilities*, *16*(3), 91-100.

Lai, M. C., Lombardo, M. V. & Baron-Cohen, S. (2014). Autism. *Lancet*, *383*(8), 896-910.

Lang, R., Regeher, A., Lauderdale, S., Ashbaugh, K., & Haring, A. (2010). Treatment of anxiety in autism spectrum disorders using cognitive behaviour therapy: A systematic review. *Developmental Neurorehabilitation*, *13*(1), 53-63.

Leeb, R. T., Bitsko, R. H., Merrick, M. T., & Armour, B. S. (2012). Does Childhood Disability Increase Risk for Child Abuse and Neglect? *Journal of Mental*

Health Research in Intellectual Disabilities, 5(1), 4-31.

Macklin, M. L., Metzger, L. J., Litz, B. T., McNally, R. J., Lasko, N. B., Orr, S. P., & Pitman, R. K. (1998). Lower precombat intelligence is a risk factor for posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology*, 66, 323–326.

Mandell, D. S., Walrath, C. M., Manteuffel, B., Sgro, G. & Pinto-Martin, J. A. (2005). The prevalence and correlates of abuse among children with autism served in comprehensive community-based mental health settings. *Child Abuse & Neglect*, 29, 1359-1372.

Matson, J. L. & Cervantes, P. E. (2014). Commonly studied comorbid psychopathologies among persons with autism spectrum disorder. *Research in Developmental Disabilities*, 35, 952-962.

Mayes, S. D., Gorman, A. A., Hillwid-Garcia, J., & Syed, E. (2012). Suicide ideation and attempts in children with autism. *Research in Autism Spectrum Disorders*, 7(1), 109-119.

McCarthy, J., Blanco, R. A., Gaus, V. L., Razza, N. J., & Tomasulo, D. J. (2017). Trauma-and stressor-related disorders. In R. J. Fletcher, J. Barnhill & S.-A. Cooper (Eds.) *DM-ID 2. Diagnostic Manual – Intellectual Disability: A Textbook of Diagnosis of Mental Disorders in Persons with Intellectual Disability*. Kingston, New York: NADD - National Association for the Dually Diagnosed.

McDonnell, C. G., Boan, A. D., Bradley, C. C., Seay, K. D., Charles, J. M., & Carpenter, L. A. (2018). Child maltreatment in autism spectrum disorder and intellectual disability: results

from a population-based sample. *The Journal of Child Psychology and Psychiatry*,
<https://doi.org/10.1111/jcpp.12993>

Mehtar, M., and Mukaddes, N. M. (2011). Posttraumatic stress disorder in individuals with diagnosis of autistic spectrum disorders. *Research in Autism Spectrum Disorders*, 5(1), 539-546.

Mevissen, L., Didden, R., & de Jongh, A. (2015). Assessment and treatment of PTSD in people with intellectual disability. In Martin, C., Preedy, V. & Patel, V. B. (Eds.) *Comprehensive Guide to Post-Traumatic Stress Disorder*. New York: Springer.

Mevissen, L., Lievegoed, R., & de Jongh, A. (2011). EMDR treatment in people with mild ID and PTSD: 4 cases. *Psychiatric Quarterly*, 82(1), 43-57.

Mevissen, L., Lievegoed, R., Seubert, A., & de Jongh, A. (2011). Do persons with intellectual disability and limited verbal capacities respond to trauma treatment? *Journal of Intellectual and Developmental Disability*, 36, 278-283.

Mevissen, L., Lievegoed, R., Seubert, A., & de Jongh, A. (2012). Treatment of PTSD in people with severe intellectual disabilities: A case series. *Developmental Neurorehabilitation*, 15(3), 223-232.

Mohiuddin, S., Bobak, S., Gih, D., & Ghaziuddin, M. (2011). Autism spectrum disorders: Comorbid psychopathology and treatment. In J. L. Matson and P. Sturmey (Eds.),

International handbook of autism and pervasive developmental disorders (pp. 463–478). New York: Springer

Moher, D., Liberati, A., Tetzlaff, J., Altman, D., & The PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Medicine*, 6(7), e1000097. <https://doi.org/10.1371/journal.pmed1000097>.

Moskowitz, L. J., Walsh, C. E., Mulder, E., McLaughlin, D. M., Hajcak, G., Carr, E. G. G., & Zarcone, J. R. (2017). Intervention for anxiety and problem behavior in children with autism spectrum disorder and intellectual disability. *Journal of Autism and Developmental Disorders*, 47(12), 3930-3948.

Murphy, G. H., O’Callaghan, A. C., & Clare, I. C. H. (2007). The impact of alleged abuse on behaviour in adults with severe intellectual disabilities. *Journal of Intellectual Disability Research*, 51, 741-749.

Myrbakk, E. & von Tetzchner, S. (2008). Psychiatric disorders and behavior problems in people with intellectual disability. *Research in Developmental Disabilities*, 29, 316-332.

O’Callaghan, A. C., Murphy, G., & Clare, I. C. H. (2003). The impact of abuse on men and women with severe learning disabilities and their families. *British Journal of Learning Disabilities*, 31(4), 175-180.

Rittmannsberger, D., Kocman, A., Weber, G., & Lueger-Schuster, B. (2018). Trauma exposure and post-traumatic stress disorder in people with intellectual disabilities: A Delphi

expert rating. *Journal of Applied Research in Intellectual Disabilities*,

<https://doi.org/10.1111/jar.12549>

Rowsell, A. C., Clare, I. C. H., & Murphy, G. H. (2013). The psychological impact of abuse on men and women with severe intellectual disabilities. *Journal of Applied Research in Intellectual Disabilities*, 26, 257-270.

Rumball, F. (2018). A Systematic Review of the Assessment and Treatment of Posttraumatic Stress Disorder in Individuals with Autism Spectrum Disorders. *Review Journal of Autism and Developmental Disorders*, <https://doi.org/10.1007/s40489-018-0133-9>

Ryan, R. (1994). Posttraumatic stress disorder in persons with developmental disabilities. *Community Mental Health Journal*, 30(1), 45-54.

Sobsey, D. & Doe, T. (1991). Patterns of sexual abuse and assault. *Sexuality and Disability*, 3, 243-259.

Sullivan, P. M. (2009). Violence Exposure Among Children with Disabilities. *Clinical Child and Family Psychology Review*, 12(2), 196-216.

Sullivan, P. M. & Knutson, J. F. (2000), Maltreatment and disabilities: a population-based epidemiological study. *Child Abuse and Neglect*, 24(10), 1257-1273.

Taylor, J. L., and Gotham, K. O. (2016). Cumulative life events, traumatic experiences, and psychiatric symptomatology in transition-aged youth with autism spectrum disorder. *Journal of Neurodevelopmental Disorders*, 8(1), 28.

Tureck, K., Matson, J. L., Cervantes, P. & Konst, M. (2014). An examination of the relationship between autism spectrum disorder, intellectual functioning, and comorbid symptoms in children. *Research in Developmental Disabilities*, 35, 1766-1772.

Turk, J., Robbins, I. & Woodhead, M. (2005). Post-traumatic stress disorder in young people with intellectual disability. *Journal of Intellectual Disability Research*, 49, 872-875.

Turner, H. A., Vanderminden, J., Finkelhor, D., Hamby, S. & Shattuck, A. (2011). Disability and victimization in a national sample of children and youth. *Child Maltreatment*, 16, 275-286.

Underwood, L., McCarthy, J., Chaplin, E. and Bertelli, M. O. (2015). Assessment and diagnosis of psychiatric disorder in adults with autism spectrum disorder. *Advances in Mental Health and Intellectual Disabilities*, 9(5), 222-229.

van der Kolk, B. (2014). *The Body Keeps the Score. Mind, Brain and Body in the Transformation of Trauma*. New York: Penguin Random House

Valenti, M., Ciriatti, T., Di Egidio, C., Gabrielli, M. Masedu, F., Tomassini, A. R. & Sorge, G. (2012). Adaptive response of children and adolescents with autism to the 2009 earthquake in L'Aquila, Italy. *Journal of Autism and Developmental Disorders*, 42, 954-960.

Weston, L., Hodgekins, J., & Langdon, P. E. (2016). Effectiveness of cognitive behavioural therapy with people who have autistic spectrum disorders: A systematic review and meta-analysis. *Clinical Psychology Review, 49*, 41-54.

Whallet, M. G., Kroes, M. C. W., Huntley, Z., Rugg, M. D., Davis, S. W., & Brewin, C. R. (2013). An fMRI investigation of posttraumatic flashbacks. *Brain and Cognition, 81*(1), 151-159.

Wigham, S. & Emerson, E. (2015). Trauma and life events in adults with intellectual disability. *Current Developmental Disorders Report, 2*, 93-99.

Table 1

Main criteria	Number of subcriteria	Subcriteria needed for diagnosis
A. Exposure to actual or threatened death, serious injury, or sexual violence	4 (A1-A4)	1
B. Intrusion symptoms associated with the traumatic event(s), beginning after the traumatic event(s) occurred	5 (B1-B5)	1
C. Persistent avoidance of stimuli associated with the traumatic event(s), beginning after the traumatic event(s) occurred	2 (C1-C2)	1
D. Negative alterations in cognitions and mood associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred	7 (D1-D7)	2
E. Marked alterations in arousal and reactivity associated with the traumatic event(s), beginning or worsening after the traumatic event(s) occurred	6 (E1-E6)	2
F. Duration of the disturbance (Criteria B, C, D, and E) is more than one month.		
G. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.		
H. The disturbance is not attributable to the physiological effects of a substance (e.g., medication, alcohol) or another medical condition.		

Table 1. DSM 5 criteria groups for PTSD (American Psychiatric Association, 2013).

Table 2

Authors	Study Group	Age (mean)	Gender (% female)	PTSD assessment strategy	(A) Exposure	(B) Re-experiencing	(C) Avoidance	(D) Negativism	(E) Arousal	Not easily classifiable
Ammerman et al. 1989	150 multihandicapped children (34 with ASD)	3-19 (9.8)	23%	Clinical Assessment	-Various forms of abuse (A1)					-Less likely to display stereotyped behavior
de Bruin et al. 2007	94 Children with Pervasive Developmental Disorder – Not Otherwise Specified (unknown number with ID)	6-12 (8.5)	11.7%	Diagnostic Interview Schedule for Children-IV, Autism Diagnostic Observation Schedule, Wechsler Intelligence Scale for Children-Revised, Children’s Social Behavior Questionnaire						
Howlin & Clements, 1995	12 children, adolescents, young adults with ASD (7 with ID)	9-23 (13.1)	Not reported	Specially Developed Parent Interview	-Abuse in school setting (A1)	-Fears of going to school (B4) -Overactivity (B4)	-Resistance to going to school (C2)	-Mood disturbance (sudden swings, screaming, irritability) (D4) -General fear and phobias (D4) -Increase in problems related to eating (D5)	-Aggressive behavior (E1) -Temper tantrums (E1) -Self-injurious behaviors (E2) -Sleep disturbance (E6)	-Marked increase of stress-related behaviors -Increased reluctance to be separated from parents
Mehtar & Mukaddes, 2011	69 children and adolescents with ASD (50 with ID)	6-19 (11.7)	23,2%	Kiddie Schedule for Affective Disorders and Schizophrenia – Present Life Version, Aberrant Behavior Checklist, Trauma Information Form	-Being victim to accident/disaster, violence, physical abuse, sexual abuse (A1) -Witnessing accident/disaster, violence, physical abuse, sexual	-Reported, but not exemplified -Agitation and restlessness (B4)		-Appetite disturbance (D5) -Regression in social interaction (D5/6) -Worsening in peer relationships (D5/6) -Regression in sharing with people (D6) -Apathy (D7)	-Increase in aggressiveness, angry outbursts (E1) -Increase in disruptive behavior (E1) -Self-harm behavior (E2) -Increased distractibility (E5) -Sleep	-Increase in restricted interest area -Increase in ritual behaviors, stereotypic movement, and motor mannerisms -Deterioration of nonverbal communication skills

					abuse (A2)				disturbances (E6)	-Regression in imitation skills -Regression/deterioration in verbal communication -Increased incontinence -Regression of previously acquired self-help skills
Murphy et al., 2007	18 adults with severe ID (6 with ASD)	(30.8)	50%	Clinical Interview, Symptoms of Abuse Interview, Mini-Psychiatric Assessment Schedule for Adults with Developmental Disability, Adaptive Behavior Scale	-Abuse (A1)			-Non-compliant behavior (D6) -Withdrawn behavior (D6)	-Aggressive behavior (E1) -Self-abusive behavior (E2)	-Increase of sexualized behavior -Increase of stereotyped behavior -Loss of skill in independent functioning, self-direction, and responsibility -Loss of skill in socialization
Rowell et al. 2013	18 adults with severe ID (6 with ASD)	(30.8)	50%	Clinical Interview, Symptoms of Abuse Interview, Mini-Psychiatric Assessment Schedule for Adults with Developmental Disability, Adaptive Behavior Scale	-Abuse (A1)	-Recollections (B1) -Dreams (B2) -Flashbacks (B3) -Distress at cues (B4) -Physiological response to cues (B5)	-Leaving room if abuse mentioned (C1) -Avoiding cues (C2)	-Loss of interest in activities (D5) -Avoiding people (D5/6) -Shortened future (D6) -Restricted affect (D7)	-Irritable/angry (E1) -Self-harm (E2) -Checking behavior (E3) -Exaggerated startle (E4) -Difficulty falling/staying asleep (E6)	-Inappropriate behavior -Need for help
Taylor & Gotham, 2016	36 youth with ASD (10 with IQ below 70)	17-22 (18.7)	16,7%	Kiddie Schedule for Affective Disorders and Schizophrenia – Present Life Version, Frequency of Life Events	-Various adverse events (A1, A2, A3)					
Valenti et al., 2012	Children and adolescents with	<18 (N/A)	Not reported	Vineland Adaptive Behavior Scales	-Earthquake (A1)			-Loss of skill in communication		-Loss of daily living skill

	ASD (unknown number with ID)							and socialization (D5/6)		-Loss of motor skill
--	------------------------------	--	--	--	--	--	--	--------------------------	--	----------------------

Table 2: Characteristics and symptoms from group studies. Symptom descriptions are assigned to specific DSM 5 criteria for PTSD, signified by the letter of the symptom group and the number of the criterion within the group. The studies by Murphy et al. (2007) and Rowsell et al. (2013) report on data from an identical sample.

Table 3

Authors	Age	Gender	Level of ID	PTSD assessment strategy	(A) Exposure	(B) Re-experiencing	(C) Avoidance	(D) Negativism	(E) Arousal	Not easily classified
Barol & Seubert, 2010	31	F	Mild	DSM IV symptom list, generic list of PTSD symptom	-Being ridiculed and made fun of by siblings and peers throughout school years (A1)			-Fear of not being heard or taken seriously (D2)	-Reactivity to being criticized or corrected (E1)	
	20	M	Moderate	DSM IV symptom list, generic list of PTSD symptom	-Mother's death at age 12 (A3) -Father's remarriage and divorce (A1)			-Assumed feelings of helplessness by carers (D2/4)	-Angry outbursts (E1)	
	28	F	Severe	DSM IV symptom list, generic list of PTSD symptom	-Peer acting out aggressively in class (A2) -Three eye operations (A1) -Multiple ear infections (A1)	-Fear of going to school (B4)			-Aggressive outbursts (E1) -Kicking people (E1) -Hypervigilance (E3)	-Increased perseverative self-talk
	22	M	Moderate /mild	DSM IV symptom list, generic list of PTSD symptom	-Father murdering patient's brother and committing suicide (A3)		-Refusal to discuss, or even name the incident (C1)	-Avoidance of social situations (D5/6) -Depressive symptoms annually around date of incident (D4)	-Screaming at peers he found annoying (E1) -Suicidal ideation annually around date of incident (E2)	
Carrigan & Allez, 2016	26	M	Mild	Revised Child Impact of Events Scale (CRIES-8)	-Violent sexual assault (A1)	-Regular re-experiences of the event - like "watching a video" (B1) -Frequent nightmares about what happened (B2)	-Had not told anyone of the assault for 3 years (C1) -Tried "not to think of it" (C1) -Did not leave house alone due to fear of	-Believed "people are out to get me" (D2) -Harsh in blaming himself for what happened (D3)	-Anger outbursts (E1) -Frequent arguments with parents (E1) -Struggled to concentrate on	

							meeting attackers (C2)	-Rumination about what he could have done to prevent it (D3) -Feelings of shame (D4)	television programmes or when reading books (E5) -Sleep problems (E6)	
Carvill & Marston, 2002	36	M	Severe	ICD-10 criteria, behavioral monitoring	-Past recurrent abuse (A1)				-Episodic aggression (E1) -Self-injurious behavior (E2)	-Rituals
	32	M	Moderate	ICD-10 criteria, behavioral monitoring	-Several moves (A1)				-Physical and verbal aggression (E1)	
Cook et al., 1993	12	M	Not specified	DSM-III-R criteria	-Physical abuse at school (A1) -Witnessing physical abuse of others at school (A2)	-Increase in intrusive memories with associated anxiety and agitation at anniversary (B1) -Fear of returning to school (B4) -Agitation and anxiety in response to symbolic events such as getting onto the expressway that might have led back to the school (B5)	-Initially reluctant to discuss any school incidents (C1) -Resisted returning to school (C2)	-Appeared agitated and frightened (D4) -Crying spells (D4) -Lost interest in pleasurable activities (D5) -20-pound weight loss (D5) -Not allow parents to touch him during crying spells, although he previously was able to be comforted by them (D6)	-Appeared agitated and angry (E1) -Awoke frequently at 3 or 4 A.M. (E6)	-Increased rocking -Became frightened of the dark
King, 2011	14	M	Mild	Not reported	-Physical, emotional and sexual assault by peers at summer camp (A1)		-Covering eyes and ears, running for the family room when company visited (C2)	-Panic attacks (D4) -Complete withdrawal from interactions with others (D5/6)	-Aggressive outbursts (E1) -Fire-setting (E1) -Initial insomnia (E6) -Afraid to go to sleep (E6)	-Increased stereotypical behavior -Described seeing "ghosts and clowns" -Sexually assaulted staff member

										-Odd posturing -Speech and communication skills deteriorated
Mevisen, Lievegoed & de Jongh, 2011	11	M	Mild	DSM-IV-TR and DM-ID criteria	-Hearing voices (A1) -Experience of mother quarreling with friend (A1) -A "nasty man" coming to his house (A1) -Car fire in front of family home (A2)		-Avoids sleeping at home where his mother lives together with her partner, the patient's brother and little sister (C2)	-Negative beliefs of "I am in danger" and "I can't do anything" (D2) -Fears (D4)	-Outbursts of anger and fights with brother (E1)	-Compulsive behaviors -Obsession with fires -Difficulties distinguishing reality and fantasy
	7	F	Mild	DSM-IV-TR and DM-ID criteria	-Seeing a dead body (A1) -Hearing a family friend had been stabbed to death (A3) -Death by illness of family member (A3)	-Disturbing thoughts about illness, death and knives (B4) -Increased symptoms after hearing of the death of Michael Jackson (B5)		-Anxiety (D4)	-Outbursts of anger (E1)	-Compulsive behaviors -Frequent mood changes
Mevisen, Lievegoed, Seubert & de Jongh, 2011	N/A	F	Moderate	DSM-IV-TR and DM-ID criteria	-Sexual abuse by two perpetrators (A1)	- Restless (B4)		-Was often tearful (D4) -Personal hygiene deteriorated (D5)	-Aggressive outbursts (E1) -Sleep problems (E6)	-Obsessive behaviors
Mevisen et al., 2012	32	F	Severe	DSM-IV-TR and DM-ID criteria	-Sexual and physical abuse by group member for at least half a year (A1)	-Exhibited unusual sexual behavior (B1) -Nightmares (B2) -Restless (B4)	-Refused to return to the group home (C2) -Slept sitting up, when asked to lie down, said "I choke" (C2) -Could not tolerate being touched (C2)	-Generally anxious (D4) -Often in a bad mood (D4) -Tired and passive (D5)	-Unpredictable, aggressive outbursts (E1) -Exaggerated startle response (E4)	-Has a panic attack whenever she hears someone sneezing or coughing

Ryan, 1994	21	F	Severe	DSM-III-R criteria	<ul style="list-style-type: none"> -Abuse by scalding (dipping her feet in scalding water) (A1) -Sexual abuse (A1) 	<ul style="list-style-type: none"> -Abrupt shrieking accompanied by drawing up of her legs and increased scratching at her legs and abdomen, in the presence of hot water running in a nearby sink. Episodes would also involve terrified, unfocused facial expression and lack of recognition of familiar staff (B1/3) -Defensive covering of her chest, lower legs, and genital area (B1) 	<ul style="list-style-type: none"> -Hypersensitivity to touch (C2) 	<ul style="list-style-type: none"> -Terrified facial expression (D4) -Hiding in the corners of consultation room (D4) -Erratic appetite (D5) -Absence of sexual behavior (D5) 	<ul style="list-style-type: none"> -Frequent self-scratching (E2) -Hypervigilance (E3) -Ongoing sleep disturbance (E6) 	
Turk et al., 2005	25	M	Severe	DSM-IV and ICD-10 criteria, modified assessment	<ul style="list-style-type: none"> -Car accident (A1) 	<ul style="list-style-type: none"> -Initially talked about it persistently (B1) -Re-enacted the accident regularly in play (B1) -Wake nightly sweating and crying and saying "I'm scared" (B2) -Frequent nightmares (B2) -Became anxious about car travel (B4) -Once in the car he would constantly touch the door handles, saying "we're going to crash" (B4) -Driving through the junction where the accident occurred led to his taking his seatbelt off, kicking the dashboard and grabbing the driver (B4) 	<ul style="list-style-type: none"> -Changed to disliking talking about it (C1) -Resisted getting in the car, kicking the car, slamming its doors and fighting his parents (C2) 	<ul style="list-style-type: none"> -More insecure in his abilities (D2) 	<ul style="list-style-type: none"> -If pushed became aggressive and threw things (E1) -Started to bite his hand frequently (E2) -Could no longer concentrate (E5) -Sleep problems (E6) 	<ul style="list-style-type: none"> -Developed enuresis

Table 3: Characteristics and symptoms from case reports. Symptom descriptions are assigned to specific DSM 5 criteria for PTSD, signified by the letter of the symptom group and the number of the criterion within the group.