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Introduction

Borderline personality disorder (BPD) affects between 1 to 6% of the population and is characterised by interpersonal difficulties, impulsivity, affective instability and difficulties with the concept of self (Grant, Goldstein, Huang, Stinson, Saha, Sharon, Smith, Dawson, Pulay, Pickering & Ruan, 2008; Lenzenweger, 2008). Due to the nature of intense emotional pain and self-harming behaviour present in individuals with BPD, it impacts on both physical and mental health (Zanarini, Frankenburg, Hennen, Reich, & Silk, 2005; Zanarini, Frankenburg, Reich, Fitzmaurice, Weinberg, & Gunderson, 2008) and is economically costly to treat (Bender, Dolan, Skodol, Sanislow, Dyck, McGlashan, Shea, Zanarini, Oldham, & Gunderson, 2001; Zanarini, Jacoby, Frankenburg, Reich, & Fitzmaurice, 2009). Experience of trauma and adversity during childhood has repeatedly been associated with BPD and similar personality features in adulthood (Allen, Cramer, Harris & Rufino, 2013; Amstadter, Aggen, Knudsen, Reichborn-Kjennerud & Kendler, 2013; Pietrek, Elbert, Weierstall, Muller & Rockstroh, 2013). As high as 71% of individuals diagnosed with BPD report a history of severe maltreatment in childhood (Cicchetti & Valentino, 2006; Lieb, Zanarini, Schmahl, Linehan, & Bohus, 2004; Widom, Czaja, & Paris, 2009); however, most studies continue to be retrospective and are based on self-report questionnaires. Therefore they are susceptible to misinterpretation of past experiences by individuals with BPD (Winsper, Zanarini, & Wolke, 2012).

The literature highlights the similarities of particular symptoms or clinical features in children who have been maltreated, and adults with BPD. These include: affective instability relationship difficulties; negative self-concept; increased risk for suicidal ideation and suicidal behaviour; and development of psychopathology (Rogosch & Cicchetti, 2005). Recent studies have also found that maltreated children are more likely to present with 'borderline personality features' than children who have not been maltreated (Belsky, Caspi, Arseneault, Bleidorn, Fonagy, Goodman, Houts & Moffitt, 2012; Cichetti, Rogosch, Hetch, Crick & Hetzel, 2014; Gratz, Latzman, Tull, Reynolds & Lejuez, 2011; Hetch, Cicchetti, Rogosch & Crick, 2014; Rogosch & Cicchetti., 2005; Winsper, Zanarini & Wolke, 2012).

Over three decades ago 'borderline syndromes in childhood' were identified as major areas of dysfunction to include: shifting between different emotional states; anxiety level; thought content and processes; relationships with others; and lack of control. Furthermore, these 'borderline syndromes' were caused by a number of different experiences including history of maltreatment, organicity, deprivation and exposure to chaotic family environments (Bemporad, Smith, Hanson & Cicchetti, 1982). Consistent with this early research, a recent review by Sharp and Fonagy (2015) highlights contextual risk and vulnerability factors for adolescent BPD such as sexual and physical abuse, maladaptive parenting (maternal inconsistency; over-involvement), peer victimisation experiences and attachment disorganisation, and genetic and neurobiological vulnerabilities.

More recently, because of stigmatisation, there has been a shift from trying to diagnose children with BPD to exploring borderline features (Cicchetti & Crick, 2009a, 2009b; Hinshaw & Cicchetti, 2000). The Borderline Personality Features Scale for Children (BPFS-C) is a recently developed validated self-report measure used to conceptualise these features in children as young as nine years old (Crick, Murray-Close, & Woods, 2005). The subscales forming a total score for the BPFS-C are Affective Instability, Identity Problems, Negative Relationships and Self-harm (Crick et al., 2005). The domains assessed in this measure are in line with the adult diagnosis of BPD but the term borderline features are less stigmatising for children early in their development (Hawes, 2014).   Recent studies have also found that maltreated children are more likely to present with 'borderline features' than children who have not been maltreated (Belsky, Caspi, Arseneault, Bleidorn, Fonagy, Goodman, Houts & Moffitt, 2012; Cichetti, Rogosch, Hetch, Crick & Hetzel, 2014; Gratz, Latzman, Tull, Reynolds & Lejuez, 2011; Hetch, Cicchetti, Rogosch & Crick, 2014; Rogosch & Cicchetti., 2005; Winsper, Zanarini & Wolke, 2012).

There is clear evidence suggesting a role of childhood adversity in the development of personality disorders (Belsky et al., 2012); and even though early intervention for BPD is now widely accepted, there are still only a limited number of studies exploring the developmental trajectory of the disorder (Hawes, 2014). In their recent review, Chanen and McCutcheon (2013) argue that BPD is a priority for developing evidence based prevention and early intervention pathways because BPD is highly prevalent in clinical

practice amongst mental health problems; it can cause the most impairment in vocational and social functioning; and it is linked to high levels of suicidality. In addition, it can be diagnosed in the early stages of the disorder and that borderline features in adolescence are flexible so this developmental period is a good stage to intervene (Chanen & McCutcheon, 2013). Therefore, developing and reviewing the evidence base of vulnerable child populations who present with borderline features would contribute to the literature around early identification and prevention for this psychopathology.

Current review

This review explores research looking at associations between maltreatment and BPD or borderline features in childhood.

Method

A protocol was developed based on recent guidelines for systematic reviews (Harms, 2009; Harris, Quatman, Manring, Siston, & Flanigan, 2013; Higgins & Green, 2006).

Criteria of inclusion and exclusion

Studies making an association between any type of maltreatment (physical abuse, sexual abuse, verbal abuse, emotional abuse and neglect) with borderline features in children or children diagnosed with a BPD were included. Studies looking at children who were 12 years or below only were included in the study selection as above 12 years old they would be within the adolescent phase of development and therefore this would answer a different search question. Case control, cross-sectional and longitudinal cohort studies were included. Descriptive studies without a statistical analysis were not included and only studies published in peer-reviewed journals were included to increase the validity of the systematic review. Only studies published in English were included.

Data Sources and Search Terms

Both an internet-based search and a manual search were used to identify relevant studies. Firstly, three online databases (OvidSP, Pubmed and Scopus) were searched for articles with no restriction on publication date. Primary identified search terms were

maltreatment, borderline disorder or *borderline features* and *child*. In addition, the online-database Psych Info was used to map the primary search terms. *Borderline* AND *child* AND *features* OR *state* OR *personality* OR *traits* OR *disorder* AND *maltreatment* OR *physical abuse* OR *sexual abuse* OR *verbal abuse* OR *emotional abuse* OR *neglect* OR *foster* OR *in care* OR *looked after* OR *adopted* OR *institution* OR *children's home*. Secondly, Google Scholar was used as a backup to check for any unidentified articles through the three online databases. The search terms *borderline* AND *children* were explored within the title of journal articles.

Finally, further articles were identified by a search of reference lists from the obtained articles from the online databases. If the identified articles were appropriate databases were used again to retrieve the abstracts and full-text articles.

Study Selection

Any articles that did not meet the study criteria were removed (stage one-identification). Duplicates were also removed at this stage. For all the remaining titles thought to meet inclusion and exclusion criteria, abstracts were retrieved and read (stage two-screening). For studies meeting inclusion and exclusion criteria the full text article was retrieved (stage three-eligibility). If the independent raters agreed on the quality rating using the Critical Appraisals Skills Programme (CASP; 2014) for case control studies the study was included and the references of the full text articles were manually screened to identify any further relevant articles (stage four-included). If any further relevant articles were identified, stages one to three were applied to these articles. The search strategy employed aimed to be sensitive as opposed to specific. Thus, many of the articles identified by databases initially did not meet criteria for this review. Figure 1 shows the summary of the study selection process.

<Insert Figure 1>

Assessment of Borderline Features or BPD

The ten studies included in this systematic review used a variety of different methods to assess either borderline personality features or BPD. Shedler-Westen Assessment Procedure 200-item Q-Sort for Adolescents was used by one study (Westen et al., 2003;

Belsky et al., 2012); BPFS-C was used by two studies (Cicchetti et al., 2014; Crick et al., 2005; Hetch et al., 2014); the UK childhood interview for DSM-IV BPD was used by one study (Winsper et al., 2012; Zanarini et al., 2004); Diagnostic Interview for Borderlines-Revised (DIB-R) used by three studies (Greenman et al., 1986; Guzder et al., 1999; Guzder et al., 1996; Zelkowitz et al., 2001); one study developed their own measure of BPD precursors (Rogosch & Cicchetti., 2005); one study used the adapted version of DSM-III-R criteria for BPD (Goldman et al., 1992) and one study used the The Coolidge Personality and Neuropsychological Inventory for Children (CPNI; Coolidge, 2005; Gratz et al., 2011). Subscales included across studies were; affective instability; interpersonal dysfunction/disturbed relatedness/negative relationships; identity problems; self-harm/suicidal ideation; inappropriate anger; emptiness/boredom; paranoid ideation/psychosis; abandonment; and impulsivity. The common subscale used across all the studies were a subscale of affective instability and a measure of negative relationships. There appeared to be considerable overlap between assessment tools used to identify borderline personality features and therefore it was concluded that all ten studies were considering the same symptoms. The symptoms were namely affective instability and difficulties in interpersonal functioning.

Data extraction

Two reviewers read and extracted relevant information (Harris et al., 2013). Data was extracted on study information (authors, year of publication, published journal, design, purpose, hypotheses and funding), study population (inclusion criteria, sample size, age and gender), statistical analysis, confounding factors, results, conclusions, limitations and generalisability. The summaries of characteristics of articles that have been included are presented in Table 1. The table presented includes a description of the sample, the measure for borderline features or diagnosis of BPD, maltreatment type, other factors correlated, confounding factors adjusted for and study results.

Quality Assessment

Quality of the studies was assessed using the CASP (2014) appraisal tool for case control studies.   The CASP considers three broad areas: Are the results valid; What are the results; Will the result help locally.

Procedure

Two reviewers independently rated thirteen studies that were included in the final stage of study selection and data extraction using the CASP. Disagreements on three studies occurred between the two reviewers. The disagreements were resolved by consensus that was obtained by discussion between the two reviewers after re-considering the article and systematic review protocol (Higgins & Green, 2006). Figure 1 presents a summary of the study selection process using the PRISMA flow chart (Liberati, Altman, Tetzlaff, Mulrow, Gotzsche, Ioannidis, Clarke, Devereaux, Kleijnen & Moher, 2009; Moher, Liberati, Tetzlaff & Altman, 2009).

Data analysis

Results were not combined in a meta-analysis because of the heterogeneity of the studies. For instance, in terms of the setting (participants were included from normal (non-clinical) settings, from clinical settings, and from social care settings (children who have been maltreated and are looked after), the broad definition of maltreatment (for example physical abuse, sexual abuse, and neglect are more common terms for maltreatment than hostility and resentment, and negative expressed emotion) and the identification of BPD or borderline features using different assessment methods and different assessors (Altman, 2001; Egger, Schneider, & Smith, 1998).

For internal consistency of definitions of BPD or borderline features, subscales for each instrument used were considered. Overlap of subscales for operational definitions of BPD or borderline features were considered to achieve consensus of the construct of BPD or borderline features within the studies (Hindley et al., 2006).

Results

The results of the ten studies included in this systematic review are shown in Table 1.

<Insert Table 1>

Study Heterogeneity

There is significant variability in the studies included in this review. The greatest variability is the method of assessing the association between maltreatment and

borderline features/BPD. Six of the studies included in this study assessed borderline features within identified maltreated children compared to non-maltreated children, which are both non-clinical populations (Belsky et al., 2012; Cichetti et al., 2014; Gratz et al., 2011; Hetch et al., 2014; Rogosch & Cicchetti, 2005; Winsper et al., 2012). The remaining four studies assessed whether there was a history of maltreatment for children who were already clinically diagnosed with BPD compared to a clinical population who were not diagnosed with BPD (Goldman et al., 1992; Guzder et al., 1999; Guzder et al., 1996; Zelkowitz et al., 2001). The different types of maltreatment assessed and the different methods or measures used to identify borderline features/BPD are described in detail below in Table 1.

Methodological Quality

Both independent raters, utilising the CASP (2014) agreed that all studies had good methodological quality. All studies were thought to have recruited their sample in an acceptable way All studies had significant *p* values (p<.05); only one study did not report *p* values; Both independent raters reported believing the results of all studies and thought all study results could be applied to the local population.

Associations between maltreatment and BPD/borderline features

Study methodology

All studies showed a significant association between BPD/borderline features and maltreatment (p<.05).

Clinical Populations (Children with BPD and children without BPD)

Four studies used clinical populations to assess whether there was a link between BPD and maltreatment (Goldman et al., 1992; Guzder et al., 1996; 1999; Zelkowitz et al., 2001). They compared children who were diagnosed with BPD to children who had other clinical presentations. They all found significant differences between the two groups on a variety of different types of abuse. Children diagnosed with BPD were more likely than those with another psychiatric disorder to have a history of maltreatment.

Maltreated and non-Maltreated children

Three studies compared maltreated and non-maltreated children on the prevalence of borderline features (Cicchetti et al., 2014; Hetch et al., 2014; Rogosch & Cicchetti, 2005),

and show that maltreated children were significantly more likely to present with borderline features.

Three studies used children from larger cohort studies (Belsky et al., 2012; Gratz et al., 2011; Winsper et al., 2012). Children in these studies were followed from birth until 11 or 12 years old. All three studies showed that children who had early experiences of maltreatment were more likely to be diagnosed with BPD or present with borderline features at age 11 or 12.

Maltreatment type across studies

Across the studies, all types of abuse and neglect were found to be significantly associated with borderline features or BPD. Physical abuse was independently associated with BPD/borderline features in five studies (Belsky et al., 2012; Goldman et al., 1992; Guzder et al., 1999; Hetch et al., 2014; Winsper et al., 2012); contrary to this however, one study showed that physical abuse was not more prevalent in children with BPD (Guzder et al., 1996) and one study showed that children with higher levels of borderline features did not have higher levels of physical abuse compared to other types of abuse (Rogosch & Cicchett, 2005). Therefore, five out of seven studies (71%) showed that physical abuse was independently associated with BPD or borderline features compared to other types of abuse or neglect.

Sexual abuse was independently associated with BPD/borderline features in three studies (Guzder et al., 1999; Guzder et al., 1996; Zelkowitz., 2001); however, one study showed that sexual abuse was not more prevalent in children with BPD (Goldman et al., 1992) and two studies showed that children with higher levels of borderline features did not have higher levels of sexual abuse compared to other types of abuse (Hetch et al., 2014; Rogosch & Cicchetti, 2005). Therefore, three out of six studies (50%) showed that sexual abuse was independently associated with BPD or borderline features compared to other types of abuse or neglect.

All three cohort studies showed that emotional/verbal abuse was independently associated with BPD or borderline features (Belsky et al., 2012; Gratz et al., 2011; Winsper et al., 2012); however, two studies showed that emotional abuse was not more prevalent in children with BPD (Guzder et al., 1996; 1999) and two studies showed that

children with higher levels of borderline features did not have higher levels of emotional abuse compared to other types of abuse (Hetch et al., 2014; Rogosch & Cicchetti, 2005). Therefore, three out of six studies (50%) showed that emotional abuse was independently associated with BPD or borderline features compared to children who have not been maltreated.

Three out of four studies exploring neglect indicate that it was independently associated with BPD/borderline features (Guzder et al., 1999; Guzder et al., 1996; Hetch et al., 2014); although another study looking at maltreatment subtypes showed that the highest prevalence of BPD precursors was within the neglected group they did not find significant differences across subtypes of maltreatment (Rogosch & Cichetti, 2005). Therefore, three out of four studies (75%) showed that neglect was independently associated with BPD or borderline features compared to other types of abuse.

In summary, all types of abuse and neglect have been found to be significantly associated with borderline features or BPD. These results suggest that any one type of abuse is not necessarily significantly more associated with borderline features/BPD compared to other types of abuse.

Dose of Maltreatment

Two studies explored whether experiencing multiple types of abuse had an increased association with BPD/borderline features; children with more types of abuse were more likely to be in the BPD group (Guzder et al., 1996) and more likely to show an increased level of borderline features (Hetch et al., 2014). Children who had experienced maltreatment across more developmental periods presented with a significantly higher level of borderline features (Hetch et al., 2014). Higher odds ratios were also observed when two types of abuse were factored rather than one for association between abuse and borderline features (Winsper et al., 2012). Therefore multiple types of maltreatment across multiple developmental periods results in increased Borderline features.

Genetic vulnerability

Research looking at genetic vulnerability (Belsky et al., 2012) and specific genotype associations (Cicchetti et al., 2014) were also reported. Results showed that family

history of psychiatric problems did contribute to presentation of borderline features (Belsky et al., 2012) contributing to the idea of a diathesis-stress model. Cicchetti and colleagues (2014) investigated two genotype groups (OXTR and FKBP5) and did not find any main effects of borderline features; however, moderation of maltreatment effects was found. A three-way interaction between gender, environment and genotype was reported (Cicchetti et al., 2014).

Cognitive and executive functioning

Four studies explored cognitive and executive functioning and its association with borderline features in maltreated children (Belsky et al., 2012; Gratz et al., 2011; Rogosch & Cicchetti., 2005; Zelkowitz et al., 2001). All four studies found a significant association between borderline features and cognitive or executive functioning difficulties. Lower levels of intellectual functioning (Belsky et al., 2012) and deficits in executive functioning skills (Belsky et al., 2012; Rogosch & Cicchetti., 2005; Zelkowitz et al., 2001) were associated with increased risk of borderline features. Children with borderline features were also found to have difficulties with Theory of Mind (Belsky et al., 2012) and temperament/impulsivity (Belsky et al., 2012; Gratz et al., 2011).

Parental risk factors

Five studies found significant associations between borderline features and other parental risk factors. Domestic violence (Guzder et al., 1999; Winsper et al., 2012; Zelkowitz et al., 2001) and parental dysfunction (including substance misuse, criminality or family psychiatric history) were all linked to a heightened risk of BPD/borderline features (Belsky et al., 2012; Guzder et al., 1999; Guzder et al., 1996). Parental divorce was also associated with higher risk of developing borderline features in one study (Guzder et al., 1999). This is in line with early research suggesting that children diagnosed with BPD were more likely to have chaotic family lives (Bemporad et al., 1982).

Other factors associated with borderline features or BPD

One study looked at externalising and internalising problems (Belsky et al., 2012) and one study looked at Post Traumatic Stress Disorder (PTSD; Guzder et al., 1996). Children who were reported by their carers as having higher levels of borderline

features also had higher levels of externalising and internalising problems (Belsky et al., 2012). Further, PTSD was significantly associated with diagnosis of BPD (Guzder et al., 1996). In addition one study looking at negative outcomes in maltreated children with borderline features found that children who had a diagnosis of BPD were more likely than those without to have been referred to youth protection, to be hospitalised, and to have been in foster care (Guzder et al., 1996).

Discussion

The ten studies included in this review are in consensus that there is a link between maltreatment and borderline features in childhood despite different methodologies used to assess this. Four of the ten studies looked at histories of children with borderline features to explore any evidence of maltreatment, and they found that children with BPD/borderline features were more likely to have a history of maltreatment compared to children with other clinical presentations (Goldman et al., 1992; Guzder et al., 1999; Guzder et al., 1996; Zelkowitz et al., 2001). The six studies exploring whether maltreated children presented with borderline features showed that maltreated children compared to non-maltreated children were more likely to present with borderline features (Belsky et al., 2012; Cichetti et al., 2014; Gratz et al., 2011; Hetch et al., 2014; Rogosch & Cicchetti., 2005; Winsper et al., 2012). Most of the studies have very large sample sizes adding to the power and significance of the findings. These results show a convergence across studies and robustness of effect regardless of methodology supporting a link between 'borderline features' and maltreatment. This supports the current adult literature showing links between maltreatment and adult BPD (Allen, et al., 2013; Amstadter et al., 2013; Pietrek et al., 2013), and suggests a common factor of maltreatment in both 'borderline features' in children and adult BPD.

There was some evidence that all types of abuse and neglect were independently associated with borderline features; physical abuse (Belsky et al., 2012; Goldman et al., 1922; Guzder et al., 1999; Hetch et al., 2014; Winsper et al., 2012), sexual abuse (Guzder et al., 1999; Guzder et al., 1996; Zelkowtiz., 2001), emotional/verbal abuse (Belsky et al., 2012; Goldman et al., 1991; Gratz et al., 2011), and neglect (Guzder et al., 1999; Guzder et al., 1996; Hetch et al., 2014). Further, for children who had experienced more than one type of abuse (Hetch et al., 2014; Guzder et al., 1996; Winsper et al., 2012). There

was evidence of a cumulative effect of maltreatment, such that those who had experienced maltreatment across more developmental periods showed significantly higher levels of borderline features (Hetch et al., 2014). These conclusions add to the existing literature suggesting that maltreatment in general is a risk factor for borderline features in children and BPD in adults (Ball & Links, 2009); and are similar to results observed in adolescents with BPD (Sharp & Fonagy, 2014). Furthermore, the severity (multiple types of abuse over multiple time periods) heightened the risk of developing borderline features (Hetch et al., 2014). This suggests that maltreatment in general is a risk factor for 'borderline features' in both children and in adults; and that more severe abuse increases the risk of developing features, in common with adult literature (Sansone et al., 2005).

Genetic vulnerability and parental dysfunction such as chaotic family lifestyle, insecure attachment styles and substance misuse in parents are also likely to impact on the risk of developing borderline features. Further, executive functioning difficulties and other internalising and externalising difficulties are associated with borderline features. Future research is required to disentangle these factors and their developmental pathways to borderline features.

Limitations

Finding convergent results across studies which have used different populations strengthens the conclusions that can be drawn from the findings. Nevertheless, one of the limitations of the studies included is that they all use different methods to diagnose BPD or identify borderline features. Some used subjective measures that were fairly new and had not been validated. Others used self-report measures that are subject to informant bias. Nonetheless, all studies found an association between maltreatment and borderline features, and there was overlap between the subscales of the instruments used to measure borderline features.

A limitation of the studies included is that the majority of studies use different definitions and classifications of abuse/neglect. This makes attempts to find specific associations between one type of abuse or neglect with borderline features problematic. The literature indicates that children often experience more than one type of maltreatment (Rogosch & Cicchetti, 2005). Studies also did not reliably consider the

severity of maltreatment experienced and how this could have impacted on borderline features. There is currently limited research looking at the individual types of abuse/neglect associated with borderline features.

This review used the search term 'borderline features' and although it tried to capture many different ways of searching this presentation by using 'borderline' with 'disorder, traits, personality, state and features' early research may have used different terminology to describe this construct in children such as 'multiple complex developmental disorder' (Cohen, Paul & Volkmar, 1987; Lincoln, Bloom, Katz, & Boksenbaum, 1998). Thus, early studies using this terminology may have not been identified during the selection process. Nevertheless, it is felt that this would have been identified through reference lists that refer to this different terminology; therefore it is not a high level of concern.

Clinical implications

This review suggests that children who have been maltreated may present with symptoms underlying borderline features such as affective instability, negative relationships and difficulties with self-concept. Furthermore, the borderline features described in these studies are very similar to the sub-threshold presentations described in children who have been maltreated (DeJong, 2010). Assessing these features individually could help to develop individualised formulation based approaches to working with maltreated children, which help to go beyond psychiatric disorders such as Emerging Borderline Personality Disorder. Early identification of these features can inform an individualised formulation for maltreated children and treatment of these features alongside psychiatric disorders such as Post-Traumatic Stress Disorder which could help to improve outcomes for them (McAuley & Davis, 2009).

The development of clear assessment pathways is considered important. As these symptoms are very broad and do not fit a particular clinical diagnosis for children they can often be undetected. Furthermore, it has been highlighted that these particular features only become evident over long periods of time as opposed to during one assessment (Bemporad et al., 1982). This is an important concept to hold in mind; if these features are difficult to identify they are likely to develop into more enduring problems in the future and become harder to treat. Another reason that these

symptoms may not be identified early on is a lack of appropriate measures to assess them. Future research should explore the possibility of developing standardised measures for clinicians to think about when assessing children with a maltreatment background. The results of this study should be interpreted with caution as 'borderline features' is a relatively new concept being explored in children and replication of findings using validated measures is necessary (Belsky et al., 2012).

Research highlights the types of interventions that have been successful in treating BPD in adults such as dialectical behavioural therapy (DBT) and mentalization-based therapy (MBT; Bateman & Fonagy, 2008; Bateman, Ryle, Fonagy & Kerr, 2007; Chiesa, Fonagy, & Holmes, 2006; Linehan, Comtois, Murray, Brown, Gallop, Heard, Korslund, Tutek, Reynolds & Lindenboim, 2006; Linehan, Dimeff, Reynolds, Comtois, Wlch, Heagerty & Kivlahan, 2002). There are also some new early intervention programmes that have shown to be effective with young people who have borderline traits such as cognitive analytical therapy (CAT) and emotional regulation group training (Chanen, Jackson, McCutcheon, Jovev, Dudgeon, Yuen, Germano, & McGory, 2008a; Chanen, McCutcheon, Germano, Nistico, Jackson, & McGorry, 2009; Schuppert, Giesen-Bloo, van Gemert, Wiersema, Minderaa, Emmelkamp, & Nauta, 2009). Given that some of these interventions are now being adapted for young people with borderline features (Chanen et al., 2008a; Chanen et al., 2009; Schuppert et al., 2009) and there is a considerable overlap between maltreated children presenting with sub-thresholds diagnoses and children with borderline features; then the same novel practices can be used as a first step in developing early intervention services for maltreated children presenting with these features. This may reduce the likelihood of these children developing severe and enduring mental health problems during adulthood.

A critical remaining question is whether borderline features in childhood is most usefully conceptualised as a construct or individual features as research is largely based on the construct of BPD in adults. Evidently, the lack of treatment for children presenting with borderline features is rooted in a history of resistance to identify differences between borderline features in childhood and adult BPD (Hawes, 2014). Further, the risk factors associated with borderline features may be tapping into a broader risk profile for later psychopathology (Belsky et al., 2012).

Future Research

The studies reviewed have not considered attachment as a moderator or mediator between maltreatment and the subsequent development of borderline features. Sharp and Fonagy (2015) report disorganised attachment as a vulnerability factor in adolescence presenting with borderline features. Therefore it is important for future research to consider disorganised attachment when considering borderline features.

A recent study has shown that aversive parenting (i.e. authoritarian, permissive, and psychologically controlling) significantly contributed to the development of borderline features in female adolescents. The same study showed that authoritative parenting was a protective factor against borderline features in adolescent males (Nelson et al., 2014). This is further supported by another recent study which has shown that maternal inconsistency and over-involvement are vulnerability factors for developing borderline features in adolescence (Sharp & Fonagy, 2015). Exploring parenting quality styles and its link to borderline features could also help identify protective as well as risky styles of parenting in relation to the development of borderline features.

The results of this study should be considered in light of the fact that 'borderline features/syndromes' can be precursors for general psychopathology and not just specifically BPD. Retrospective studies need to be conducted to assess whether the borderline features observed in these studies are later developed into BPD (Rogosch & Cicchetti, 2005) or indeed if they may be a generic risk factor for other disorders. This would not only support understanding of developmental pathways between maltreatment and BPD but also understanding resilience factors for those whose borderline features diminish with age. These identified protective factors would support development of early intervention services for maltreated children presenting with borderline features or at risk of developing these features and reduce risk of later psychopathology.

Conclusions

This systematic review showed convergence across all ten studies reviewed. All ten studies show significant associations between maltreatment and borderline features despite different methodologies. This review further adds to the literature that borderline features are closely related to experiences of childhood maltreatment, but

also highlights other factors such a genetic vulnerability. Furthermore, if these borderline features are present in childhood then methods of identifying these features should be developed. Although there are only a limited number of studies showing the link between maltreatment and borderline features in children the clinical implications are fundamental in shaping early intervention services. This is important particularly if these features are risk factors for developing later severe and enduring mental health difficulties (Belsky et al., 2012). Future research should explore the link between borderline features in childhood and later pathology through longitudinal studies. The severity of maltreatment by number of types experienced and duration should be considered in these studies. Standardised classification systems such as the Maltreatment Classification System (MCS; Barnett, Manly & Cicchetti, 1993) could be used to define maltreatment. This research would also help identify and develop early intervention services for a vulnerable population.

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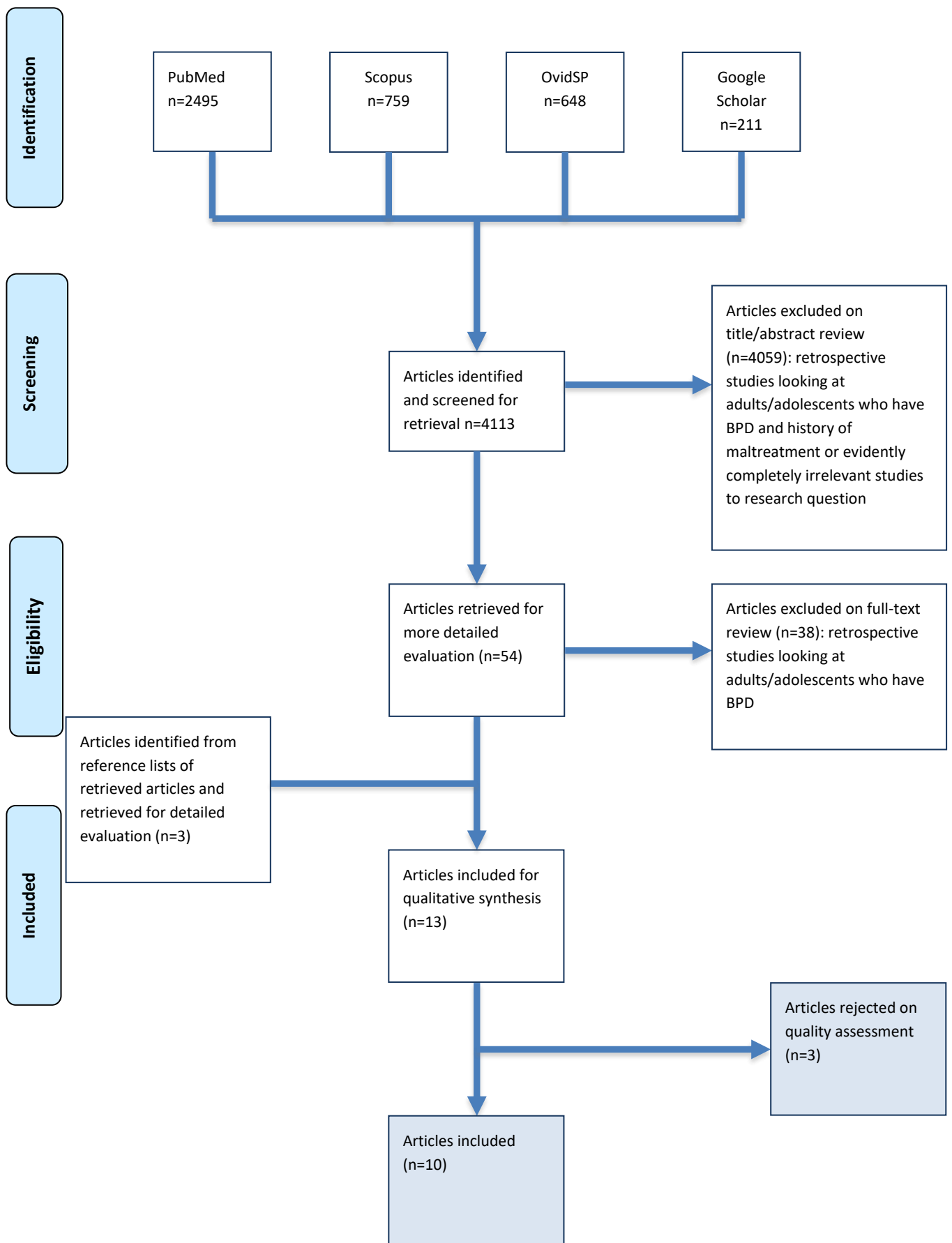
Figure 1. Summary of Study Selection Process

Table 1. Shows the details of the ten studies included in the systematic review

Author (year) & Title	Study Design & Setting	Subjects	Diagnoses/measure used to identify borderline features	Abuse type/s *Identification*	Confounding factors	Statistical results for maltreatment and other associated factors with BPD or Borderline Features
Belsky et al. (2012) Etiological features of borderline personality related characteristics	Longitudinal Cohort Study within UK	1116 pairs of same sex twins followed from birth to 12 years (Borderline features assessed at age 12)	Mothers responses to questions from dimensional assessment of borderline features from the Shedler-Westen Assessment Procedure 200-item Q-Sort for Adolescents (Westen et al., 2003) Subscales: affective instability/dysregulation, impulsivity/behavioural dysregulation and disturbed relatedness/interpersonal dysfunction	Physical Emotional (maternal negative expressed emotion) *Interview with parents and Speech Samples*	Family background (e.g. social class) Genotypes	Compared to his/her non-maltreated twin, the physically maltreated twin exhibited more Borderline Personality Related Characteristic's (r=.06, p=.023*) Maternal negative expressed emotion (r=.39, p<.001***) Family psychiatric history (r=.17, p<.001***) IQ, (r=-0.11***) Executive function (r=-0.06*), Theory of Mind (r=-0.11***), temperament (r=0.10***), impulsivity (r=0.34***) externalising (r=0.44***) and internalising problems (r=0.29***)
Cicchetti et al. (2014) Moderation of maltreatment effects on childhood borderline personality symptoms by gender and oxytocin receptor and FK506 binding protein 5 genes	Case control study within US	1051 maltreated and non-maltreated children (age 8-12 year olds, mean=10.37, SD=1.30)	Borderline Personality Features Scale-Child (BPFS-C) (Crick et al, 2005) is a self-report questionnaire used to measure borderline personality features. The scale was developed based on consultation with author of Personality Assessment Inventory (Morey, 1991) a measure used to assess borderline personality pathology in adults Subscales: affective instability, identity problems, negative relationships & self-harm	Neglect Emotional Physical Sexual *Maltreatment Classification System**	Age Gender Socio-economic status	More maltreated children (21.7%) than non-maltreated children (13.7%) were represented in the high borderline symptoms group (Chi-Square (1)=11.37, p<.001) Maltreated girls in the OXTR genotype AG-AA group had significantly (p=.016) BPFS-C scores than girls in GG group; opposite effect was found for boys (p<.000) Maltreated girls with one or two copies of the CATT haplotype had significantly higher BPFS-C scores than did non maltreated girls (p=.003); Among non-maltreated boys those with one or two CATT copies had significantly higher scores than did those with zero copies (p=.04) The three way interaction separately for each gene (maltreatment status, gender, and OXTR/FKBP5) was significant (F(1, 1,014)=5.75, p=.017 & F(1, 1,012)=5.75, p=.008 respectively)
Winsper et al. (2012) Prospective study of family adversity & maladaptive parenting in childhood and borderline personality disorder	Longitudinal Cohort Study within UK	6050 children followed from birth to 11 years (mean 11.74 years)	Borderline features were assessed using a face-to-face semi-structured interview: the UK Childhood Interview for DSM-IV Borderline Personality Disorder (Zanarini et al., 2004) based on the borderline module for the DSM-IV Personality Disorders (1996) Subscales: intense inappropriate anger, affective instability, emptiness, identity disturbance, paranoid ideation, abandonment, suicidal or self-mutilating behaviours, impulsivity &	Physical (hitting) Emotional (shouting, hostility & resentment) *Parenting Index***	Age Gender DSM Diagnoses IQ	Experience during Preschool of hitting OR=1.43 (1.10-1.86); shouting OR=1.22 (0.94-1.58); hostility OR=1.49 (1.07-2.08); resentment OR=1.17 (0.81-1.67) Experience during School of hitting OR=1.43 (1.10-1.86); shouting OR=1.22 (0.94-1.58); hostility OR=1.56 (1.06-2.29) Suboptimal parenting index (hostility, resentment, shouting/hitting) OR=1.13 (1.05-1.23) Family adversity includes more than 2 items out of hitting & shouting, parental attitude, domestic violence or conflict in partnership between parents OR=1.99 (1.34-2.94)

						intense unstable relationships.
Guzder et al. (1996) Risk Factors for Borderline Pathology in children	Case control study within Canada	98 children assessed for day treatment: n=41 for borderline and n=57 for non-borderline (age 7 to 12 year olds)	Diagnostic Interview for Borderlines (C-DIB-R), an assessment used to classify borderline children through chart review (Greenman et al., 1986) Subscales: Impulsivity, Affect, Psychosis, & Interpersonal Relations	Sexual Physical Verbal Neglect *Interviews with parents, children and professionals*	Age Gender	Only two types of abuse were independently significant: sexual abuse (B=1.7, SE=0.8, p<.05, OR=5.5) & severe neglect (B=1.2, SE=0.5, p<.01, OR=3.6) Children with more types of abuse were more likely to be in the borderline group (Chi-square=18.9, df=4, p<.001); Correlation between cumulative abuse scores & C-DIB-R score r=.36, p<.001) Children with high cumulative parental dysfunction (histories of substance abuse or criminality) scores were more likely to be in borderline group (Chi-square=17.3, df=4, p<.01); Correlation between cumulative parental dysfunction & C-DIB-R score r=.23, p<.05) Other significant outcomes: PTSD (Chi-Square= 12.3, p<.001), Referred to youth protection (Chi-Square=16.2, p<.0001), Hospitalised (Chi-Square=10.2, p<.01), Ever in foster placement (Chi-square=8.4, p<.01), Age (r=.27, p<.01) & Gender (t=-3.2, df=96, p<.002)
Guzder et al. (1999) Psychological Risk Factors for Borderline Pathology in School-Age Children	Case control study within Canada	94 children assessed for day treatment: n=41 for borderline and n=53 for non-borderline (age 9-12 year olds, mean=9.8)	Diagnostic Interview for Borderlines (C-DIB-R), an assessment used to classify borderline children through chart review (Greenman et al., 1986) Subscales: Impulsivity, Affect, Psychosis, & Interpersonal Relations	Sexual Physical Verbal Neglect *Interviews with parents, children and professionals*	Age Gender	Physical abuse (Chi-square=6.8, p<.01), sexual abuse (Chi-Square=10.6, p<.001) & severe neglect (Chi-Square=7.4, p<.01) was significantly more common in the borderline group Witnessed violence (Chi-square=11.5, p<.001), Chronic parental separations (Chi-square=5.0, p<.05), Parental divorce (Chi-square=8.7, p<.01) & Parental criminality (Chi-Square=9.0, p<.01) were significant risk factors associated to the borderline group The above 7 variables were assessed in a logistic regression with group as dependant variable, only sexual abuse (OR=4.5, p<.02) & parental criminality (OR=2.8, p<.05) remained significant
Rogosch & Cicchetti (2005) Child maltreatment, attention networks, and potential precursors to borderline personality disorder	Case control study within US	185 maltreated and 175 non-maltreated children attending summer camp research program (age 6-12 year olds)	Authors developed a BPD precursors composite using features indicative of high vulnerability for later BPD Features included: intense negative affect & emotional volatility, temperamental construct of effortful control & diminished effortful control, interpersonal relationship difficulties, representation of self & other, self-harming behaviours & suicidal behaviour	Neglect Emotional Physical Sexual *Maltreatment Classification System**	Age Gender	Maltreated children presented with a significantly elevated level of BPD precursors compared to non-maltreated children (t(347.85)=4.10, p=.000) High BPD precursors group differed significantly only on the conflict network score (F(1, 359)=10.66, p=.001)

Goldman et al. (1992) Physical and Sexual Abuse Histories Among Children With Borderline Personality Disorder	Case control study within US	44 children diagnosed with borderline personality disorder (mean age=10.8, SD=3.6) and 100 comparison children (mean age=10, SD-4.3)	DSM-III-R criteria for BPD was adapted to account for developmental difference across childhood; children who met at least four of the eight symptoms were considered to have a diagnosis of BPD Symptoms: unstable & intense interpersonal relationships, impulsiveness, affective instability, inappropriate intense anger & lack of control of anger, recurrent suicidal threats or self-mutilating acts, marked disturbance in self-perception, chronic feelings of emptiness or boredom & frantic efforts to avoid or major preoccupation with real or imagined abandonment	Physical Sexual *Interviews with parents, children and professionals*	Age Gender Family Occupation	Children with BPD had a significantly greater frequency of abuse than did the comparison group (Chi-square=25.5, df=3, p<.001) Children with BPD had a significantly greater frequency of physical abuse than did the comparison group (z=2.1, p<.05) but not for sexual abuse
Zelkowitz et al. (2001) Diatheses and Stressors in Borderline Pathology of Childhood: The Role of Neuro-psychological Risk and Trauma	Case control study within Canada	86 school ages children referred for psychiatric day treatment: 35 met criteria for borderline pathology (age 7-12 years, mean age=9.8)	Diagnostic Interview for Borderlines (C-DIB-R), an assessment used to classify borderline children through chart review (Greenman et al., 1986) Subscales: Impulsivity, Affect, Psychosis, & Interpersonal Relations	Sexual *Interviews with parents, children and professionals*	Age Gender	Sexual abuse independently contributed to the logistic regression analyses of borderline pathology (OR=3.98, p=.04) Other independently associated significant risk factors: witnessing violence (OR=4.92, p=.02), Wisconsin card sorting test (OR=6.17, p=.002), Child Behaviour Checklist-Thought Problems Score (OR=1.08, p=.004) & Continuous performance test (OR=1.09, p=.05) The combined model of all 5 factors explains 48% of variance in group assignment (Chi-Square=37.9, p<.0001), only CBCL was no longer significant, the other 4 factors continued to make significant contribution to the regression
Hecht et al. (2014) Borderline personality features in childhood: The	Case control study within US	314 maltreated and 285 non-maltreated children (age 10-12, mean age=11.3,	Borderline Personality Features Scale-Child (BPFS-C) (Crick et al, 2005) is a self-report questionnaire used to measure borderline personality features. The scale was developed based on consultation with author of Personality Assessment Inventory	Physical Neglect Emotional Physical	Age Gender Race Socio-	Maltreated children reported significantly higher levels of borderline features than did non-maltreated children (F(1, 590)=28.3, p<.001) Physically neglected children had significantly higher scores than did non-maltreated children on all four sub-scales: affective instability (p<.001), identity problems (p=.003), negative relationships (p=.005) & self-harm (p=.001)

				Sexual	economic status	Physically abused children had significantly higher scores than did non-maltreated children on: negative relationships (p=.01) & self-harm (p<.001) Children who had experienced three of four subtypes of maltreatment compared to one or two subtypes presented with an increased level of borderline features (F(2, 589)=14.9, p<.001) The number of developmental periods the maltreatment occurred (chronicity) significantly predicted higher borderline features (B=2.892, SE=0.544, p<.001)
role of subtype, developmental timing, and chronicity of child maltreatment		SD=0.94)	(Morey, 1991) a measure used to assess borderline personality pathology in adults Subscales: affective instability, identity problems, negative relationships & self-harm		*Maltreatment Classification System**	Logistic regression was used to test if patterns of onset and recency of maltreatment significantly predicted whether a participant would meet criteria for the high risk group (individuals who score 1SD higher than the mean on BPFS-C)- Chi-Square=10.116, df=3, p<.05); Inclusion in the early onset, not recent group significantly predicted whether a participant would meet criteria for high-risk group (B=0.958, SE=0.434, p<.05, OR=2.607); Inclusion in the early onset, recent group was also significant predictor (B=1.166, SE=0.437 p<.01, OR=3.208)
Gratz et al. (2011) Exploring the Association Between Emotional Abuse and Childhood Borderline Personality Features: The Moderating Role of Personality Traits	Cross sectional study within US	225 children employed from a larger sample (age 11-14 years, mean=12.15, SD=0.82)	The Coolidge Personality & Neuropsychological Inventory for Children (CPNI; Coolidge, 2005) is a 200 item, caregiver respondent measure of DSM-IV Axis I & II pathology and related difficulties among children & adolescents. This study combined the borderline features scale and the trait of affective dysfunction scale. Subscales: inappropriate anger, affective instability, emptiness/boredom, identity problems, transient paranoia or dissociation, efforts to avoid abandonment, self-harm/suicidality, impulsive actions & unstable relationships	Emotional *The Emotional Abuse Subscale of the Childhood Trauma Questionnaire– Short Form****	Depression symptom severity Anxiety symptom severity Delinquent behaviours Oppositional Defiant Disorder Conduct Disorder	Significant correlation observed between BP features and Emotional Abuse (r=.27, p<.01) Emotional abuse accounted for a significant amount of independent variance above and beyond personality traits (F(1,215)=8.69, p<.01) Two way interactions of emotional abuse with both affective dysfunction and impulsivity accounted for a significant amount of additional variance in BP features above and beyond the main effects of these factors (F(2,213)=3.67, p<.05)

*Reference Barnett et al., (1993)

** Waylen, Stallard, Stewart-Brown S (2008)

***Bernstein et al., (2003)