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Abstract: Suicide is a major problem in Western society. However we have very little understanding of suicidal behaviour among individuals with autism spectrum disorders. The purpose of this review is to synthesise primary research on suicidal behaviour among adolescents and young adults with autism spectrum disorders in order to estimate prevalence and to identify and critically evaluate risk factors for suicidal behaviour in this population. Five primary research studies were identified for this review following a comprehensive literature search. The available research provides little empirical evidence for the processes underlying suicidal behaviour in adolescents and young adults with autism.

Abstract

Suicide is a major problem in Western society. However we have very little understanding of suicidal behaviour among individuals with autism spectrum disorders. The purpose of this review is to synthesise primary research on suicidal behaviour among adolescents and young adults with autism spectrum disorders in order to estimate prevalence and to identify and critically evaluate risk factors for suicidal behaviour in this population. Five primary research studies were identified for this review following a comprehensive literature search. The available research provides little empirical evidence for the processes underlying suicidal behaviour in adolescents and young adults with autism.

Keywords

Asperger

Autism spectrum disorder

Adolescents

Suicidal behaviour

Mental health

Abbreviations

ASD: Autism Spectrum Disorder

AS: Asperger Syndrome

DSH: Deliberate self-harm

LD: Learning disability

PDD-NOS: Pervasive Developmental Disorder-Not Otherwise Specified

TD: Typically developing

Contents

Introduction pg. 4

Method pg. 9

Prevalence pg. 12

Evidence for risk factors also found in the typically developing population pg. 14

Evidence for risk factors unique to the ASD population pg. 17

Discussion pg. 20

Limitations of current research pg. 22

Future research pg. 23

Clinical implications pg. 24

Summary pg. 59

References pg. 27

1. Introduction

Suicidal behaviour is recognised as a major public health problem around the world particularly among adolescents and young adults. Suicide is the second leading cause of death in those aged 10-24 years worldwide (Hawton, Saunders & O'Connor, 2012).

People with an autism spectrum disorder (ASD) have difficulties in the areas of communication and social interaction and tend to have restricted interests. They may also display repetitive, stereotyped behaviours. In the DSM-IV (American Psychological Association [APA], 2000) and ICD-10 (World Health Organisation [WHO], 1996) diagnostic categories include Asperger Syndrome (AS), autistic disorder (or classic autism) and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS). Throughout this review the authors will use the collective term ASD to refer to individuals with these diagnoses.

The body of systematic research on the mental health of people with ASD is small but growing and we know that people with ASD do die by suicide (Mouridsen, Bronnum-Hansen, Rich & Isager, 2008). The clinical literature also documents cases of deliberate self-harm (Balfe & Tantam, 2010; Wing 1981; Wolff & Chick, 1980) and suicidal ideation (Clarke, Littlejohns, Corbett & Joseph, 1989; Raja, Azzoni & Frustaci, 2011).

Suicidal behaviour refers to suicidal ideation, deliberate self-harm and completed suicide. Suicidal ideation describes thoughts and cognitions about suicide. Suicidal ideation is relatively common among young people and does not always reflect

severe pathology (Evans, Hawton, Rodham & Deeks, 2005; Shtayermmann, 2008). In the United Kingdom the term *deliberate self-harm* describes any deliberate non-lethal act of self-injury, which may or may not be accompanied by suicidal ideation and/or suicidal intent (Hawton, Harriss, Sumkin, Bale & Bond, 2004). Self-harm is more common among young people: in the UK, the majority of people who self-harm are aged between 11-25 years and the average age of onset is 12 years of age (Camelot Foundation, 2006). Completed suicide is most prevalent in mid to late adolescence and early adulthood (<25 years; Schafer & Pfeffer, 2001); cases of completed suicide are rare in younger children (Windfuhr et al, 2008).

Risk factors for suicidal behaviour among children and young people include demographic variables such as age, gender, and ethnicity (Hawton, Rodham & Evans, 2002; Hawton & James, 2005; Mann, 2002; Steele & Doey, 2007); concurrent psychiatric disorder, especially anxiety and depression (Hawton & James, 2005; Jacobson & Gould, 2007; Steele & Doey, 2007), family history of psychiatric disorder or suicidality (Hawton & James, 2005; Steele & Doey, 2007) and substance misuse (Hawton & James, 2005; Madge & Child and Adolescent Self-harm in Europe [CASE] study collaborators, 2004). Interpersonal risk factors include family dysfunction (Hawton & James, 2005; Steele & Doey, 2007), social isolation, bullying and relationship difficulties (Camelot Foundation, 2006); stressful life events (Steele & Doey, 2007) and abuse (Camelot Foundation, 2006; Jacobson & Gould, 2007; Steele & Doey, 2007). Other risk factors include access to means (Steele & Doey, 2007), low self-esteem and poor self-image (Madge et al, 2004).

Although suicidal behaviour has been observed among people with ASD, it is likely that its occurrence is underreported (Fitzgerald, 2007). Available research does suggest that suicidal behaviour is a clinically significant problem among people with ASD. E.g. Raja, Azzoni and Frustaci (2011) described some form of suicidal behaviour among eleven out of 26 psychiatric patients with ASD, including completed suicide in two cases.

It is only recently that studies have been published describing suicidal behaviour in this population. Mikami et al (2006) outlined the case of a 23 year old man with AS who attempted suicide by burning himself. In this case the authors identified predisposing factors including low self-esteem, due to difficulties in establishing interpersonal relationships, and feelings of social isolation, due to problems in his relationship with his parents and lack of peer relationships. Mikami et al (2006) identified the core deficits of ASD (e.g. lack of emotional reciprocity) and his parents' lack of understanding of ASD as key factors in this young man's relationship problems with his parents. The authors argue for the importance of identifying ASDs and providing intervention for the core deficits as well as for predisposing factors of suicidal behaviour. In another case Spence et al (2011) described the case of a 44-year-old man who was admitted as a psychiatric inpatient after attempting suicide by cutting his wrists. The man was diagnosed with AS and major depression. As a university student he experienced problems with depression, anxiety, substance misuse and had also cut his own wrists with the intention of killing himself. In both of these case studies the men had harmed themselves in response to factors which are common clinical features of ASD, i.e. difficulties in establishing interpersonal relationships and a strong need for sameness,

A factor in the underreporting of suicidal behaviour may be the prevalence of non-suicidal self-injury among those with ASD, which may make recognising suicidality in this population more difficult. Self-injury that is stereotypic and habitual is commonly observed among those with ASD, particularly among individuals with impaired communicative abilities and severe learning disability (Oliver & Richards, 2010). Wachtel et al (2010) described the treatment of depression in a 19-year-old man with autistic disorder and a mild learning disability using electroconvulsive therapy (ECT). The authors report clinical features including catatonia and self-injury that was both stereotypic and deliberate. Another case study by Wachtel, Jaffe & Kellner (2011) describes an eleven-year-old boy with autistic disorder who received a diagnosis of bipolar affective disorder and was treated with ECT. Parent report indicated that the treatment of the depression resulted in the almost complete eradication of self-injury after the eighth session of ECT.

If clinicians do not assess whether self-injury is occurring in the context of suicidal ideation in this population then the problem suicidal behaviour may be overlooked due to diagnostic overshadowing, whereby clinicians attribute presenting problems to the core difficulties of the child's diagnosed disability or disorder rather than to a secondary mental health problem (Paschos & Bouras, 2005).

If clinicians are to offer a high-quality, individualised service to individuals with ASD it is necessary to have an in-depth understanding of the biological, psychological and social factors that impact the mental health of this population.

Suicidal behaviours typically emerge in early adolescence while deliberate self-harm and completed suicides are most prevalent among adolescents and young adults. This review aims to make a meaningful contribution by synthesising and summarising research to date on suicidal behaviour in adolescents and young adults with ASD. Specific objectives are to outline evidence of the prevalence of suicidal behaviours and to identify correlates as well as possible risk and protective factors among young people with ASD. This review also seeks to highlight the need for basic research in this area.

2. Method

This review is based on a systematic search of published articles available up to April 2012. It was carried out in accordance with published literature on the methodology of conducting systematic reviews (Grant & Booth, 2009; Greenhalgh, 1997; Khan, Kunz, Kleijnen & Antes, 2003). A search of the Cochrane Library indicated that there were no existing reviews or meta-analyses of this topic. Next, a comprehensive search of PsycInfo, Medline, Web of Science and the Cochrane Library was carried out using a combination of keyword searches and Medical Subject Headings (MeSH). The MeSH and keyword search terms included 1. Asperger(s) Syndrome, Autistic Disorder, Autism, Child Development Disorders, Developmental Disabilities and Pervasive Developmental Disorders; 2. Attempted Suicide, Self harm, Self-injurious behaviour, Self mutilation, Suicidal behaviour, Suicidal Ideation, Suicide, Suicide prevention, Suicidology and Psychological Autopsy. Variations of keywords e.g. both English and American spellings were included in database searches. In addition, the reference lists of selected articles were searched and keyword searches were conducted within specialist journals covering the topic of suicidal behaviour or autism. If full text versions of articles were not available authors were contacted directly by e-mail.

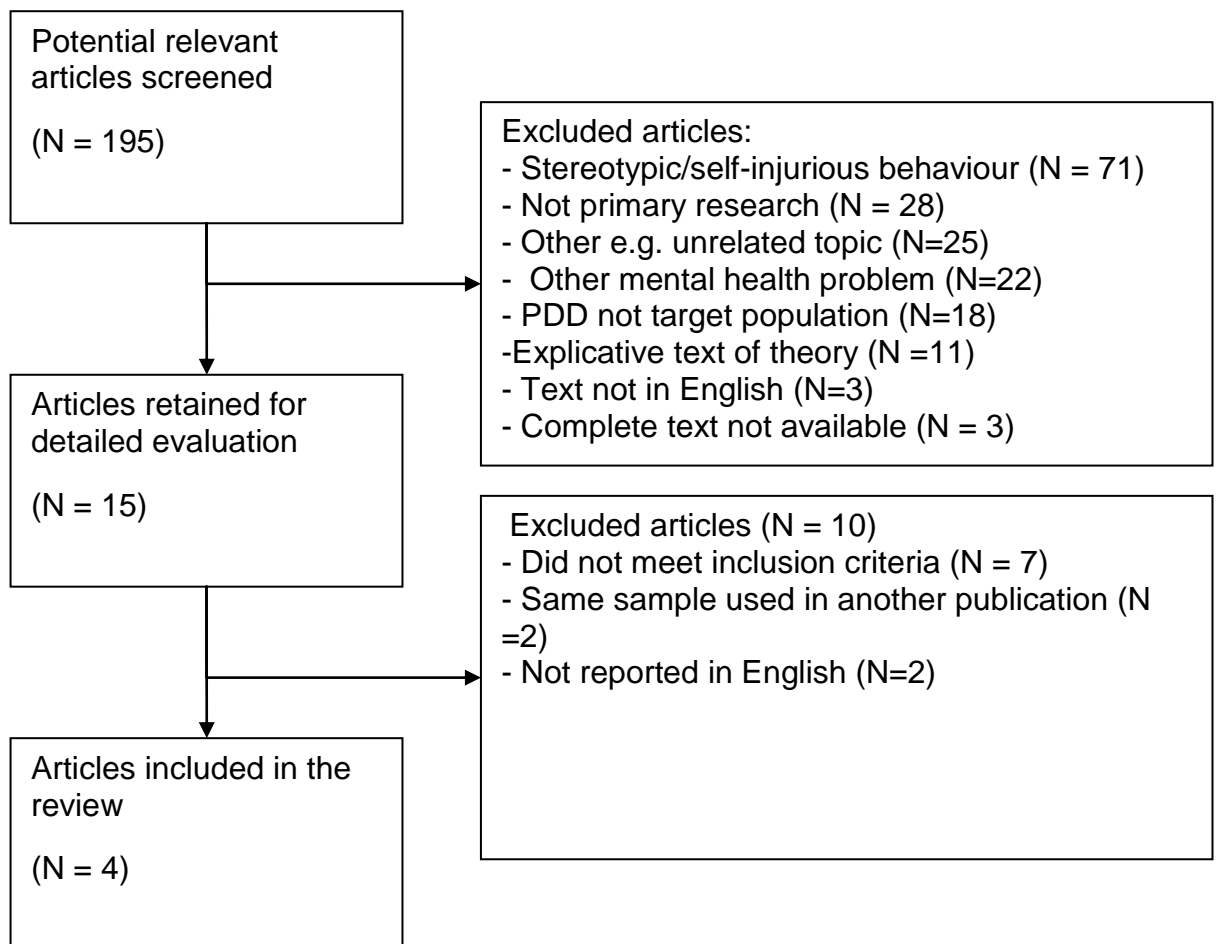
Inclusion criteria were that the paper described a piece of primary research on the topic of suicidal behaviour (including suicidal ideation, deliberate self-harm and attempted or completed suicide) among participants aged 25 years or younger (young people and young adults in this age range will be referred to as young people) with a diagnosis of ASD. Studies of self-injurious behaviour characterized as stereotypic or habitual were excluded, e.g. repetitive self-stimulating behaviour, in

order to minimize clinical heterogeneity. Studies that focused solely on individuals with learning disabilities were also excluded.

This search strategy yielded a total of 15 papers. Six studies were rejected because they did not meet the inclusion criteria outlined above. Another two studies were rejected because they were not available in English. One author had two journal articles and one dissertation abstract published, all of which used data from the same sample; therefore the most relevant of these papers was selected for the review. In total four studies were included in the current review. A QUORUM diagram showing the paper retrieval process can be found in Figure 1.

The papers were reviewed for quality, but due to the heterogeneity of the papers, standardised scoring for quality was not appropriate. The findings are nonetheless considered in the context of methodological strengths and limitations.

Figure 1: QUORUM diagram showing paper retrieval process¹



The findings from the reviewed articles are considered in terms of prevalence, risk factors, and the association between ASD and suicidality. The principle features of the included studies are shown in table 1. It should be noted that researchers used a variety of diagnostic terms, some non-standard, to describe participants and, where possible, this is clarified by the present authors. The studies varied in how thorough the process of assigning an ASD diagnosis was established. Furthermore, researchers did not independently verify ASD diagnoses.

¹ 'Excluded articles' refers to articles retrieved from Medline & PsycInfo searches only

Table 1 Description of studies included for review

Reference	N	Sample	Method of assessing ASD	Control group	Method of assessing suicidal behaviour	Major findings
Mandell et al (2005)	182	Clinical sample of children (69.2% male) with a mean age of 11.6 years (SD 3.8 years) with diagnoses of AS, (N=156) and Autistic Disorder, (N=26).	Psychiatric diagnosis in clinical record	Study participants (N=108) without a history of abuse	Suicidal ideation and suicide attempts assessed using medical chart review and parent-report	Lifetime prevalence of attempted suicide among participants who were physically abused (N= 22) 31.6%, sexually abused (N=26) 40% and controls, 7-8.5%. Attempted suicide predicted a history of sexual abuse (p=.05)
Mikami et al (2009)	12	Clinical sample of adolescents (41.7% male) with a mean age of 17.1 years (SD 1.6 years) with diagnoses of AS (N=6) and PDD-NOS (N=6). Three participants had typical FSIQs (>100), eight had an FSIQ > 70 and one participant had an FSIQ of < 70.	Parent interview, Wechsler Adult Intelligence Scale-Revised (WAIS-R) or Wechsler Intelligence Scale for Children, 3rd Edition (WISC-III), Autism Spectrum Quotient-Japanese Version (AQ-J), case conferencing with other psychiatrists.	N= 80 typically developing study participants (11.3%, male) with a mean age of 16.9 years (SD, 1.6 years)	Medical chart reviews identified patients who had engaged in DSH with suicidal ideation	Twelve participants were diagnosed with ASD after admission. Participants with ASD were significantly less likely to have a mood/anxiety disorder than TD participants (p=.037). Five participants with ASD with a history of DSH.
Mukaddes & Fateh (2010)	37	Clinical sample of children and young people (86.5% male) with a mean age of 10.9 years (SD 4.5 years) with diagnoses of AS. There were N= 23 children (age range 6-11 years) and N = 14 young people (age range 12-20 years). Participants had a mean FSIQ = 116 (SD 14).	Clinical interview of parents & children	None	Suicidal behaviours were identified through clinical interviews of children/young people & their parents. Researchers did not specify the type of suicidal behaviours.	Six adolescents displayed suicidal behaviours and all met DSM criteria for major depressive disorder.
Shtayermman (2007)	10	Community sample of young people (90% male) with a mean age of 19.7 years (SD 3 years) with diagnoses of AS	Krug Asperger's Disorders Index (KADI)	None	Self-report, parent-report and the Suicide Ideation Questionnaire (SIQ) identified suicidal ideation.	Five participants obtained SIQ scores indicating clinically significant levels of suicidal ideation. There was a significant, negative correlation between level of suicidal ideation and severity of AS symptoms, (p=.001). There were positive correlations between level of suicidal ideation and level of anxiety symptoms, depressive symptoms and peer victimisation (not significant)

Prevalence

The studies provide some indication of the extent of the problem of suicidal behaviour among young people with ASD. Shtayermman (2007) investigated the prevalence of suicidal ideation among a community based sample of young people with AS (N=10). Half (N = 5) of the participants displayed clinically significant levels of suicidal ideation according to the Suicidal Ideation Questionnaire (SIQ; Reynolds, 1991), a standardised self-report measure for adolescents. However this finding

must be interpreted with caution since the SIQ was not designed for use with individuals with an ASD. Its validity and reliability among this population has not been investigated.

Mandell et al (2005) report the prevalence of suicide-related problems, which they defined as both suicidal ideation and attempted suicide, among a cohort of 182 children with an ASD who had been physically or sexually abused. Information on suicidal behaviour was obtained from parents using a structured clinical interview.

Among a sub-sample of 22 children who had been physically abused there was a lifetime prevalence of 31.6% for attempted suicide. For 14.6% of this sub-sample a suicide-related problem was the main reason for presenting to mental health services. Among a sub-sample of 26 children who had been sexually abused a lifetime prevalence of almost 40% for attempted suicide was reported. For 30.8% of these children suicide-related problems were the primary presenting problem. Children without an abuse history had a lifetime prevalence of 7-8.5% for attempted suicide. The higher prevalence of attempted suicide among individuals with a history of abuse is in keeping with findings from the general population (Jacobson & Gould, 2007). Figures for those with an abuse history are at the lower end of the scale compared to prevalence rates among TD young people (Evans et al, 2005). This finding may be explained to some extent by the mean age of 11.5 years in this sample, since the typical age of onset for self-harm is around 12 years of age (Camelot Foundation, 2006). In another study six adolescents with AS (42% of the study sample) presented with problems with 'suicidal behaviour' (Mukaddes & Fateh,

2010). However, the researchers did not describe the nature of the suicidal behaviour in these participants.

The study by Mikami et al (2009) took a different approach by investigating the prevalence and clinical features of ASD among a sample (n = 94) of young people. These young people had engaged in deliberate self-harm with signs of suicidal ideation and were subsequently admitted to hospital. Almost 13% of the sample were diagnosed with AS or PDD-NOS. The prevalence of ASD among this cohort is much higher than the prevalence of ASD in the general population.

Evidence for risk factors also found in the typically developing population

Age

The age profile of participants displaying suicidal behaviours is also similar to the typically developing population. Participants displaying suicidal behaviours in four of the review studies were aged between 12-20 years (Mikami et al, 2009; Mukaddes & Fateh, 2010; Shtayermman, 2007). One study investigated differences between groups based on age (Mukaddes & Fateh, 2010): In this mixed sample of children (aged 6-11 years) and adolescents (aged 12-20 years) all individuals displaying suicidal behaviour were aged 12-20 years.

Gender

The high rate of male participants in the studies reviewed is reflective of the higher prevalence of ASD among males. However suicidal behaviour is likely to be a problem among both males and females with ASD. Mukaddes and Fateh (2010) noted that all female adolescents in their sample displayed suicidal behaviours.

Psychiatric disorder

Two studies systematically investigated the relationship between co-morbid psychiatric disorders and suicidal behaviour (Mikami et al, 2009; Shtayermman, 2007). Based on their correlational analysis Mikami et al (2009) found a significantly lower rate of mood and anxiety disorders among participants with a diagnosis of AS or PDD-NOS. Of the twelve participants with ASD, one met DSM criteria for a diagnosis of mood disorder, another was diagnosed with an anxiety disorder (Mikami et al, 2009) and ten were diagnosed with an adjustment disorder. Other risk factors for suicidal behaviour were present for the participants: six had a history of psychiatric problems and five had attempted suicide. Analysis did not demonstrate statistically significant differences between the twelve young people and the control group on these variables. Interpretations from statistical analysis of this data must be treatment with caution since the assumptions of the chi-square test used to compare groups were violated with cell sizes less than 5.

Shtayermman (2007) reported that six out of ten participants had additional psychiatric diagnoses. Two individuals obtained scores on the Patient Health Questionnaire for Adolescents (PHQ-A; Johnson et al, 2002) indicative of major depressive disorder; another three obtained scores indicative of generalized anxiety disorder. Using correlational analysis Shtayermman (2007) demonstrated a negative, non-significant correlation between suicidal ideation and the level of depressive or anxious symptomatology. This finding is not surprising given that suicidal thoughts are relatively common among young people, and are not themselves an indicator of psychopathology (Hawton & James, 2005).

All six individuals displaying suicidal behaviour in the Mukaddes & Fateh (2010) study met DSM-IV criteria for major depressive disorder, while five met criteria for an additional diagnosis of anxiety disorder.

Physical & sexual abuse

In the study by Mandell et al (2005) rates of suicide related problems were significantly more prevalent in children who had been sexually abused compared to children without a history of sexual abuse. Using logistic regression the researchers demonstrated that presenting with suicide related problems approached statistical significance in predicting a history of sexual abuse (but not physical abuse). Having made a suicide attempt was predictive of a history of sexual abuse among this sample. The strength of this research is that it was possible to establish sexual abuse as a possible risk factor for suicidal behaviour.

Bullying

Although Mikami et al (2009) did not systematically investigate the relationship between suicidal behaviour and bullying, they reported that nine of the twelve young people with ASD had been bullied. No information is provided on the number of participants in the non-ASD group who had been bullied.

Shtayermman (2007) investigated the relationship between suicidal ideation and peer victimization. Peer victimization was measured using a standardized, 15 item self-report rating scale: the Social Experience Questionnaire (Crick & Grotpeter, 1996). This scale measures the frequency that respondents experience

overt victimization², relational victimization³ and how often they are the recipients of prosocial behaviours. Correlational analysis found a non-significant positive correlation between level of suicidal ideation and degree of total peer victimization. The effect size was larger for the relationship between level of suicidal ideation and overt victimization versus relational victimization. The small sample size (n=10) calls into question the wisdom of using a correlational analysis, but also suggests a larger sample size might have yielded significant results.

Evidence for risk factors unique to the ASD population

We will now discuss more potential risk factors drawing on contextual evidence in the reviewed research as well as the extant literature. These include the role of intellectual functioning and the association between ASD and suicidal behaviour.

Intellectual functioning

Hurley (1998) claimed that individuals with severe or profound learning disabilities are protected from suicidal behaviour due to their inability to conceptualise, plan and carry out acts of suicidal behaviour. We know that the majority of individuals with ASD, approximately 70%, have a comorbid learning disability (Bouras et al, 1999). The majority of participants in the studies reviewed had diagnoses of AS and were likely to have normal levels of cognitive functioning. In the two studies that included full scale intelligence quotients (FSIQs), all but one participant had an FSIQ greater than 70. Three participants in Shtayermman (2007) had obtained a college degree. Based on this evidence it would be reasonable to hypothesise that it is those adolescents and young people with ASD without LD who are at most risk of suicidal

² Refers to instances of physical or verbal bullying e.g., being hit or called names

³ Refers to emotional bullying tactics e.g. being excluded by other children

behaviours. Higher levels of cognitive functioning may mean individuals are more likely to experience a broader range of risk factors associated with suicidal behaviour. Research evidence indicates that people with an ASD of average intelligence are more likely to experience feelings of low self worth (Capps, Sigman & Yirmuga, 1995).

The relationship between ASD and suicidal behaviour

In their discussion, Mikami et al (2009) suggest that having ASD may itself be a risk factor for suicidal behaviour. Although their study does not provide empirical evidence for this hypothesis they argue that factors associated with an increased risk for suicidal behaviour in young people including interpersonal problems, poor problem solving skills, social isolation and impulsivity are characteristic problems of ASD.

Other deficits that may also increase the risk of suicidal behaviour include a lack of emotional awareness, poor problem-solving skills and difficulties with perspective taking (theory of mind deficits, e.g. difficulty in imagining the impact of their death on others). Mikami et al (2009) also suggest that the individuals with ASD who have greater social and communication skills, may be more likely to experience some of the risk factors associated with suicidal behaviour because they have relatively greater contact with others compared with other young people with ASD.

Shtayermman (2007) demonstrated that participants with less severe AS symptomatology expressed higher levels of suicidal ideation. These findings may lend support to the hypothesis of increased contact suggested by Mikami et al

(2009). However we know that suicidal ideation occurs relatively frequently among young people. Furthermore it could be argued that these higher functioning individuals are more affected by other risk factors associated with suicidal behaviour due to greater emotional insight.

It is also important to acknowledge research documenting poor outcomes for adults with ASD who have limited capacity to live independently (Barnhill, 2007; Cedurlund, Hagberg, Billstedt, Gillberg & Gillberg, 2008). Poor outcomes have also been reported for those with high levels of cognitive functioning. Balfe & Tantam (2010) utilised a community sample of adolescents and adults diagnosed with AS. They reported that these individuals had trouble living independently, tended to lead socially isolated lives and experienced a range of interpersonal and social problems including unemployment. Taken together the evidence presented suggests that young people with ASD experience a range of risk factors likely to have a negative impact on their mental health. It is possible, particularly among high functioning individuals, that these risk factors may precipitate difficulties such as anxiety, depression or suicidal behaviour.

The relationship between delay in diagnosis and suicidal behaviour

Delayed diagnosis is a feature of two studies reviewed herein. In the study by Mikami et al (2009) none of the individuals had met the DSM-IV criteria for autistic disorder however they were diagnosed with either AS or PDD-NOS after admission for attempted suicide. Mukaddes & Fateh (2010) also diagnosed four participants with AS. Shtayermman, (2007) investigated the relationship between age at

diagnosis and level of suicidal ideation. There was a positive correlation between these two variables, however the relationship was not significant.

Discussion

In light of the evidence reviewed thus far suicidal behaviours appear to be a clinically important problem in young people with an ASD. The rate of suicidal behaviours in the studies reviewed appears to be similar to the rate among the typically developing population. The rate of ASD diagnosis among the sample investigated by Mikami et al (2009) was high. Furthermore this study excluded young people who presented to services after self-harm but did not require admission to hospital. Therefore the rate of 12.8% of ASD diagnosis may be an underestimation of the number of young people with an ASD who actually present for medical treatment following suicidal behaviour. Based on their research, Mikami et al (2009) suggest that possibility of ASD should be considered in cases of suicidal behaviour, particularly among males.

These findings also indicate that children and young people with ASD engage in suicidal behaviour in the context of risk factors identified among the typically developing population including psychiatric disorder and sexual abuse. Another risk factor identified was bullying, although the empirical evidence presented regarding bullying was less robust. Empirical evidence is not available to support the hypothesis that delayed diagnosis may precipitate suicidal behaviour. However in the case study reported by Spence et al (2011) the man reported finding it helpful to know why he was different from others after receiving a diagnosis. He also received multifaceted intervention following diagnosis, which helped him to manage difficulties associated with AS. These difficulties are likely to have contributed to his suicidal

behaviour. Therefore we may hypothesise that the delay in diagnosis may have contributed to his suicidal crisis due to a misunderstanding about difficulties and lack of access to appropriate supports.

Thus far we have presented evidence suggesting that young people with ASD most at risk of suicidal behaviour are those with high levels of cognitive functioning, with greater levels of social and communication skills who are likely to be living in the community and actively engaged in the community (i.e. attending mainstream schools, universities, workplaces).

Although young people with ASD appear vulnerable to risk factors commonly associated with suicidal behaviour there is surprisingly little research on the topic. One explanation of this lack of research is that there are a number of issues that may impact on the accurate recognition and treatment of suicidal behaviour in this population. Some of these issues are discussed below.

The impact of risk factors may be moderated by the nature and severity of the core deficits in communication, social interaction and flexibility experienced by an individual with an ASD. For example young people with ASD can lead more socially isolated lives than typically developing young people (Mazurek & Kanne, 2008). However, some individuals with ASD may not be interested in forming peer relationships. For example, Lasgaard, Nielsen, Eriksen and Gossens (2010) found that 21% of adolescent boys with autistic disorder reported being lonely and having difficulty in making friends, however their analysis did not demonstrate a correlation between loneliness and difficulties in making friends.

The issue of diagnostic overshadowing is also relevant to the accurate assessment of suicidal behaviour among individuals with ASD. Young people with autism and a comorbid learning disability may lack the cognitive or adaptive abilities to conceptualise, plan and carry out acts of self-harm with suicidal intent or ideation. However there is no reason to presume that they do not self-harm as a maladaptive coping mechanism or a way of expressing difficult emotions (Camelot Foundation, 2006). E.g. Mandell et al (2005) found that rates of self-injury were higher among children who had been physically or sexually abused (24% and 30.8% respectively) and this finding was statistically significant for children who had been sexually abused when compared with children without a history of sexual abuse. Having a history of sexual abuse has also been identified as a correlate of non-suicidal self-injury among adolescents (Jacobson & Gould, 2007).

Limitations of reviewed research

This review has highlighted the lack of research on the topic of suicidal behaviour among young people with ASD. A key limitation of the reviewed research is small sample size, which limits the validity of conclusions drawn from the statistical analyses in some studies (Mikami et al, 2009; Shytammerman, 2007).

In the reviewed research prior clinical diagnoses were accepted. Overall there was a lack of information on how the original diagnoses were established. It is important that researchers take steps to verify the diagnoses of participants in order to clarify issues around the thoroughness of diagnosis. Two studies did take some steps to

independently verify ASD diagnoses, e.g. using a standardised self-report measure (Shtayermman, 2007) and clinical interview (Mukkades & Fateh, 2010) However, practice guidelines recommend that a diagnoses of ASD can only be established after a comprehensive history taking, clinical observation and gathering of further contextual and functional information (e.g. SIGN, 2007).

For the most part the research is limited to a single diagnostic subgroup, AS. Another limitation is that some researchers did not report IQ (Mandell et al, 2005; Shtayermman, 2007) which does not allow us to interpret findings in relation to the typically developing population.

Some of the studies did not provide information on how suicidal behaviours were operationalised and assessed (Mukaddes & Fateh, 2010). It was also noted that some researchers used terminology i.e. attempted suicide, which is not in keeping with the most recent conceptualisations of suicidal behaviour. Since suicidal behaviour comprises a heterogeneous set of behaviours, forms of suicidal behaviour should be differentiated and clearly described in research. Researchers should also include clear descriptions of how suicidal behaviour is assessed.

This review may be subject to publication bias due to the exclusion of grey literature, e.g. unpublished work, dissertations and exclusion of research not published in an English language journal.

Future Research

An obvious recommendation is that a greater volume of research is conducted on all aspects of suicidal behaviour among young people with ASD. Establishing accurate

prevalence rates is essential to determine the extent of the problem and to provide a basis for prevention and intervention programmes. Therefore, epidemiological research using population-derived samples is necessary. Establishing a clear picture of risk and protective factors for suicidal behaviour will also aid in the accurate assessment of suicidal behaviours. It would be very useful to compare groups of young people with ASD with and without suicidal behaviour. There is also a clear need for systematic research on the treatment of suicidal behaviour among young people with ASD displaying suicidal behaviour.

The use of homogenous samples from difference diagnostic subgroups is particularly important considering that ASD comprises a highly heterogeneous group with varying levels of cognitive and adaptive functioning. Using homogeneous samples, future studies could investigate the relationship between differential diagnosis, cognitive impairment, severity of autistic symptoms and suicidal behaviour.

The development of risk assessments for suicidal behaviour in individuals with ASD is an area requiring development. Qualitative research designs investigating young people's understanding of suicidal behaviour and the meaning of suicidal thoughts and behaviours to them may contribute to this process. Researchers also need to investigate the validity and reliability of available measures in the ASD population, e.g. SIQ.

Clinical Implications

This review presents evidence that suicidal behaviour is a problem experienced by individuals with ASD. The need for clinical awareness of this issue is clear. In light of

evidence presented by Mikami et al (2009) clinicians treating individuals with suicidal behaviours also need to be aware of the features of ASD and refer for assessment if appropriate. Based on the reviewed evidence it is reasonable to hypothesise the importance of addressing ASD symptomatology in alleviating difficulties with suicidal behaviour. It is also essential that assessment of suicidal behaviours is individualised and risk factors must be considered in the context of the core deficits of ASD, e.g. social withdrawal may be indicative of a lack of interest on the part of the young person in developing friendships and may not necessarily be experienced as a lack of social support or social isolation, but this should not be assumed.

Summary

This review is the first to synthesise literature on suicidal behaviour among adolescents and young adults with ASD. A key finding of this review is that there is very little research focussing on this important issue. The studies reviewed suggest that rates of suicidal behaviour in those with ASD are similar to the TD population. Further research to establish the extent of this problem among young people with ASD is warranted. Suicidal behaviour in those with ASD is likely to occur in the context of risk factors also found among TD young people such as comorbid mental health problems, abuse and bullying. There may also be a range of risk factors unique to the ASD population including the relationship between core deficits of ASD and suicidal behaviour, delay in diagnosis and intellectual functioning. Diagnostic overshadowing and the prevalence of non-suicidal self-injury are complicating factors, which may have a role in the apparent lack of literature on the issue of suicidal behaviour in this population.

Suicidal behaviour may be most frequently observed among those who have the cognitive ability to conceptualise, plan and carry out suicidal plans. Higher functioning individuals may represent a high-risk group as they struggle to function in mainstream settings and experience frequent interpersonal conflict. Clinicians need to be aware of the risk of suicidal behaviour among those with ASD: the recognition and treatment of comorbid mental health problems, particularly depression, in this population may be critical in the prevention of suicidal behaviour. However it also important that clinicians are mindful of the features of ASD in young people presenting with problems with suicidal behaviour and other mental health problems.

Declaration

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